

AVIATION WEEK

A McGRAW-HILL PUBLICATION

AUGUST 1, 1955

50 CENTS



Freedom Has a New Sound!

All over America these days the blast of supersonic flight is shattering the old familiar sounds of city and countryside.

At U.S. Air Force bases strategically located near key cities our Airmen maintain their *round the clock* vigil, ready to take off on a moment's notice in jet aircraft like Convair's F-102A all-weather interceptor.

Every flight has only one purpose — your personal protection! The next time jets thunder overhead, remember that the pilots who fly them are not willful disturbers of your peace; they are patriotic young Americans affirming your *New Sound of Freedom!*

PUBLISHED FOR BETTER UNDERSTANDING
OF THE MISSION OF THE U.S.A.F. AIR DEFENSE COMMAND

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION



Douglas C-47 Skytrain powered by four 1500 h.p. Pratt & Whitney R-985 engines.

How the Holley "hidden co-pilot" does two jobs with one handle control

Throughout the entire operational range of the new Douglas C-47, engine power and propeller governs will always be automatically controlled. This leaves a "two-handle" job but at this rate the pilot is alone with a single control lever and the help of a Holley Power Control which functions like a "hidden co-pilot". One of these controls installed on each 550-hp. Pratt & Whitney Aircraft T-34 engines automatically senses altitude, air temperature and speed and feeds

the information to its never-center—a series of precision-machined hydraulic valves. These valves automatically interpret this information as levels of engine power which is automatically adjusted through power matching at full by the control.

The Holley Power Control not only coordinates the engine and propeller for all forward thrust conditions but also controls the vital reversing of thrust necessary to reduce the aircraft's landing roll. Designed, developed and manufactured by Holley, the "hidden

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Say, Walter,
which actuating
system works best
at HIGH
temperatures?

Whatever the temperature—from a roasting 200° to a frigid -65°, pneumatic systems always give fast-acting, dependable performance!

Because viscosity of the air used as pneumatic

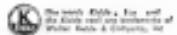
systems remains essentially the same over an extremely broad temperature range, the systems are never sluggish!

Pneumatic systems are weight-and-space savers, too! Smaller lines are used, and no return lines are required. What's more, you actually store energy from a lightweight, low-horsepower compressor, eliminating the need for a heavy, high-horsepower source!

With pneumatic systems, leakage is no serious problem. The compressor itself automatically compensates for any minute leaks which might occur. Nor is there any danger from fire with pneumatic systems, since the air used in the systems cannot burn!

We here at Kidde have a complete line of pneumatic system components, as well as facilities for engineering complete pneumatic systems. If you have a problem in pneumatics, please write us.

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FOR
PNEUMATICS

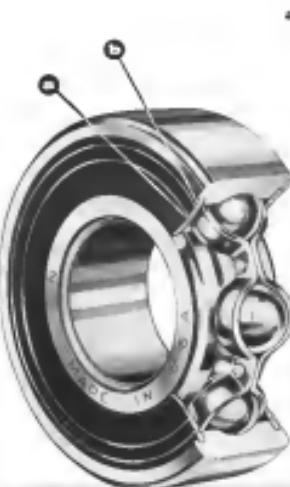


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FACTS

about

NEW DEPARTURE BALL BEARINGS



New Sentri-Seal...on guard against dirt and wear!

The unique design of the Sentri-Seal gives optimum protection against dirt and includes a number of other major advantages.

Sentri-Seals are quickly removed, easily reinstalled. As the seal is of synthetic rubber, in which two metal rings are embedded, it constantly spring a closure between the rings. Internal flexibility prevents distortion of the bearing outer ring due to heat and moisture, permitting the use of bearings to the highest accuracy specifications. The spring action insures an efficient sealing contact with the bearing ring to bear dirt and noise. Lubricants and Sentri-Seals are selectively rated by oil and greases and operate satisfactorily through a temperature range of -45°F to 235°F. Specifications available for all higher temperatures. It applies where lubrication is desired, it is easily accomplished by the customer method.

The New Sentri-Seal basically consists of two impregnated metal rings, "A" and "B" laminated in synthetic rubber, resulting in a spring which eliminates distortion. This seal is designed to withstand temperatures up to 235°F and to provide a tight seal at low torque. Bearing shown is illustrated with two types:



The diagram shows in section the New Departure Sentri-Seal. Lip contacting surfaces are firmly ground simultaneously with the ball race, giving an extremely high degree of consistency between seating surfaces and the raceway.

Sentri-Seals are available for a range of sizes in single-row, shielded-with-bearing and also in two types of New Departure adapter bearings. Sizes, dimensions and capacities are listed in the latest New Departure catalog.

Write for full details on Sentri-Seal.

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

NEWS DIGEST

Domestic

USAF flight test crews from Edwards AFB test work took over Phase 2 testing of Lockheed Aircraft Corp's first prototype YC-130 Hercules. Tests will be flown from Palmdale by Edwards ground and air crews. Production Allison T56 turboprop, meanwhile, were being installed on the second prototype, replacing experimental YT56 engines that have powered the two test model cargo planes until now.

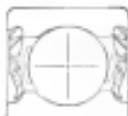
Convair-San Diego received a \$8.6-million Air Force contract for 10 cargo-passenger versions of the Model 340 transport. Arnold Air Force Strategic Air Command and Military Air Transport Service. Delivery is to begin July 1956.

Loyalty subcontractor to McDonnell Aircraft Corp's Jupiter, orders totaling \$57,875,000 for F-101 Voodoo wings, was placed with Glenn L. Martin. Martin already is building wings for the USAF jet fighter under a small production contract.

Rear Adm. Arthur Sorensen, 53, retired chief of Navy's Bureau of Aeronautics and holder of early altitude records for powered aircraft, died Feb. 22 in Washington, D. C. Sorensen was graduated from the U.S. Naval Academy in 1921 and qualified as an aviator three years later. In 1929, he set altitude records of 19,340 ft. for land-based aircraft and 35,500 ft. for sea planes. In 1930 he reached 45,166 ft. in a flight that drew attention for the first time to temperature and wind problems at high altitude.

Curtiss-Wright Corp received new USAF contracts totaling \$49,901,000 for production of 367 transport aircraft.

Franklin Engine & Aircraft Corp purchased the assets of Midwest-Lewis Co., subsidiary of McCulloch Motor Co. The Los Angeles firm's line of high-pressure compressors, valves, actuators and related parts will be integrated with the personnel and assets acquired previously by Franklin's Status Divi-



sion. Goodrich Aircraft Corp will begin construction the month of a new air compressor and laboratory building at Eastfield Park, Ariz. The unit will extend facilities of the aeroelasticity and aerospace development departments of Goodrich's Arizona plant.



Pilot Skill Saves Prototype Gnat

New Pilatus Gnat lightweight fighter was saved by a skilled test pilot after an escape from his seat harness caused him to fly off his feet and shoulder while the plane was doing 500 mph. The plane tipped off pilot E. A. Trenerry's helmet, leaving him without oxygen or radio at 30,000 ft. While looking for his home field, the fuel supply ran out. Trenerry, in final approach, his landing gear broken by machine gun fire, pulled up on the Gnat's wings and made a safe belly landing with only superficial fuselage damage. The cockpit is scheduled to receive six light trees next month. Photo shows the new Gnat just prior to its first flight (AWW July 25, p. 5). Classroom prototype, the Miles Miger, articles for new and more powerful T-33s down Royal Air Force and trigger compound panels behind canopy. Miles had 1,646 B-17s built Armstrong-Siddeley Viper jet.

New \$3.2-million air terminal at Milwaukee's General Mitchell Field opened April 22.

As technical director and chief of the group's design team in Novartis Agrofertil, he intended to continue guided missile and supersonic aircraft projects at Hawker Siddeley.

Financial

Republic Aviation Corp's consolidated net income for the first half of 1955 reached \$3,612,192, more than double the \$4,397,518 for the same period last year. Sales amounted to \$130,594,755, compared with \$116,943,845. Present backlog of unfilled orders \$700 million, declining from \$900 million a year ago.

Glen L. Martin Co. reported a net profit of \$5,522,375 for the first six months of this year, dropping from \$6,642,602 for the first half of 1954 when no federal taxes were required because of losses carried forward from earlier years. Sales totaled \$126,990,000, increasing 10.6% over the same period last year.

International

St. Arnold Hall, one of Britain's leading aircraft and guided missile experts who headed the Royal Aircraft Establishment's Comet investigation, will join the Hawker Siddeley group

completed the last phase of winter trials by the Royal Aircraft Establishment at Farnborough, making 500 simulated flights in full polarization and turbulence. The trials will continue in the fall. Later also an external fan evaluation and other research

AVIATION CALENDAR

Aug. 5-16—Inauguration of the International Soaring, second National Turbine Powered Air Transportation Meeting, Chicago, Ill., Senate.

Aug. 10-14—Air Power Area, Corporation and Government Programs, San Francisco.

Aug. 15-19—Society of Automotive Engineers' West Coast Colloquium, Marquette Hotel, Milwaukee, Wisconsin.

Aug. 19-21—Antique Aeroplane Area, second annual Convention and Pic Pic, Miami Beach, Fla.

Aug. 22-25—Symposium on Electronics and Automatic Production, sponsored by the San Jose Research Institute and the National Industrial Contractors Board, Mission Palace Hotel, San Francisco.

Aug. 22-25—National Retail Survey and Economic Planning, Gas Dynamics Symposium, Stamford, Conn.

Aug. 24-26—Western Electronic Show and Convention (WENCON), Civic Auditorium and Fairmont Hotel, San Francisco.

Aug. 25-28—National Ignition Conference, organized by the Research Department of the American Corp., Schenectady, N.Y.

Sept. 1-3—Fifty-ninth National Aircraft Show, Philadelphia International Airport, Philadelphia, Pa.

Sept. 10-12—Aircraft Design & Production, National Manufacturing Flight Clinic, Rockford, Ill., Rockford.

Sept. 14-16—Society of British Aircraft Constructors' Show and Flying Display, Farnborough, England.

Sept. 14-17—National Tool Builders' Area, Production Engineers' Show and Meeting, New York, New York, and Industrial Amplifiers, Chicago.

Sept. 17-18—American Society of Photogrammetry, International Convention and Trade Show, Statler Hotel, Los Angeles.

Sept. 18-20—International Society of Authors, Publishers and Editors' Conference, Picton Station Hotel, Bristol.

Oct. 13—Eleventh annual National Electronics Conference, Hotel Sherman, Chicago.

Oct. 14-18—National Aircraft Show and Ignition Conference, sponsored by Champion Spark Plug Co., Keweenaw Hi. Rd., Toledo, Ohio.

Oct. 17-19—National Business Aviation Area eighth annual Management Seminar, Statler Hotel, Detroit, Mich.

Oct. 31-Nov. 15—National Aerospace Congress, sponsored by American Association of Airport Executives and University of Oklahoma, Norman, Okla.

Oct. 18-25—Society of Automotive Engineers' Golden Anniversary, Aeromarine Marine Aircraft Products Seminar, Hotel St. Regis Engineering Douglas, Hotel Statler, Los Angeles.

Oct. 27-29—International Air Transport Area, 13th annual general meeting, Wall Street Annex Hotel, New York.

"Use this clamp for the toughest holding jobs!"



Where extremely strong tension is required in holding sheet metal during fabrication, Moogram Wing Nut Clamps are the perfect answer. Any desired degree of tension can be applied by simply turning the wing nut after the needles have been inserted into the rivet holes. 10 sizes to handle material thickness up to 1/8".

This is just one of many Moogram Clamps designed for every requirement in sheet metal fastening. Special clamps can be developed for unusual applications. Call your nearest Moogram representative or write for catalog and complete information.

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WHO'S WHERE

In the Front Office

Gene Black, president of Lake County Aerocraft, a producer of land aircraft. Dr. R. E. Stewart, Illinois LCA, president, chairman of board, and Joseph J. O'Connell, vice officer.

Harry E. Bafile, executive vice president of Bellanca Aircraft Corp. Michael J. Murphy, general manager of Canadian Aircraft Corp. and was president of Bang-Werner Corp.

John T. Conroy, vice president treasurer of Eddie Airlines. Other new officers: Jim E. Keaynes, secretary; J. W. Lewellen, manager.

Tom Hobbs, assistant vice president, properties and facilities, American Airlines.

Honors and Elections

Warren Lee Parsons, board chairman of Trans World Airlines, elected president of the Association of American Airlines.

Henry Blocker, president of Service Corporations of America elected vice president of the Institute of Navigation.

Ronald C. Goldsmith, director of financial operations for Lockheed Aircraft Corp., George Elerson and John E. Shad, Jr., directors of Douglas Aircraft Co.; and James C. Long, Long Beach Division, elected members of the Council of Institute of America.

Changes

W. H. Yule, general manager of North American Aviation's Fresno, Calif., plant, became manager of the proposed S. G. V. Corp. division of the company under construction at the company's Colton, Calif., division.

Dr. Elwood Thorndike, director of scientific research, Republic Aviation Corp., Farmingdale, N.Y.

Dr. Gordon J. Knobell, staff member of the Research and Technical Division of Miller Helicopters, Palo Alto, Calif.

W. H. Gauss, controller of land aircraft Englewood, Colorado.

Walter S. Powell, manager of the West Division of Van Dorn Aircraft, Inc., Tulsa, Okla.

Paul G. Brown, compiler for Aeron, Division of VCI Industries Inc., Pasadena, N.J.

Ray A. Tritton, assistant to the general manager, West Coast Division of Convair Division, San Diego, Calif.

Dr. Wallace C. Shook, director of the new Research Foundation, Juniper Hill, lead Graduate Center, set up under the part sponsorship of United Aircraft Corp. and R.P.T. Industries, members for immediate organization. E. Charles Campbell, associate professor in the College of Business, helped organize program.

Dr. Michael J. De Soto, chief aerospace engineer, Polytechnic Research & Development Co., Brooklyn, N.Y.

Jack A. Stark, manager of contract division, Aeromarine Aircraft, Inc., New Haven, Conn.

George H. Gannaway, director of maintenance of the New York Air Brake Co.

INDUSTRY OBSERVER

► North American F-4HOD is scheduled to make its first flight in October. The Dog model of the Super Sabre series will feature boundary layer control utilizing engine compressor air bleed blown over the top flaps for better landing characteristics and will be equipped with auto-pilot, intercom radio and probe and drogue refueling devices. A substantial portion of the original F-80C's skin has been shifted to the Dog model for fighter bombers and long range fighter fighters.

► Total of 13 Northrop SM-1 Skunk models have dropped into the Atlantic ocean accidentally during flight testing at the USAF Long Range Missile Test Center, Patrick AFB, Fla. Three other aircraft were named by guidance malfunction. USAF warps are now returning to the waters off Cape Canaveral at "Skunk-adited waters."

► Douglas Aircraft Co. is considering Los Angeles International Airport as a possible location for its DC-8 final assembly plant. The company already owns 40 acres there. Other sites mentioned have been the Douglas Long Beach and Tucson facilities. Long Beach managers at present are not even long enough for fuel tanks on the B-66 jet launcher. The B-66 now must take off from Long Beach sheet of marsh equipped, with fuel tank stored at Tustin. Company is asking Long Beach City Council to provide funds for runway extension.

► North American Aviation's efforts to break into the executive transport market with a 500 mph twin engined aircraft for the Navy are getting well underway from a transport version of the Douglas A3D Skymariner. Navy is extremely interested in the transport version of the A3D at a high speed plane similar to what Navy hopes to have.

► USAF has accepted the first production version of the Convair F-102A. The production version has a different paint job than earlier F-102A models featuring a grey fuselage, black pointed nose cone and dull green patches on the top of the nose ahead of the cockpit and on the top of both engine air intakes. Officially released dimensions on production F-102A are length 56 ft, wingspan 38 ft and height 18 ft. F-102A has been flown to an altitude of over 55,000 ft during flight trials at Edwards AFB.

► North American's modified F-102 incorporating fins to correct high subsonic control problems (AW, Feb. 28, p. 6) still has stability problems just under Mach 1.2 but settles down after passing the speed of sound. F-102 will fly trouble-free once higher than 55,000 ft.

► General Electric engineers say that the JT7 turbojet will be the last of their line to meet titanium exhausts. They will avoid use of such titanium in future designs as a result of their experience with the metal on the JT8.

► National Advisory Committee for Aeronautics will build a supersonic type range this fall to handle speeds up to Mach 1.8. The range will use windtunnels ranging from a length of one-eighth each apiece. Cost will be \$531,000.

► Canada will contribute about \$321 million to the cost of building the North American solar warning network. The Mid-Canada section, early warning stage will cost about \$170 million and be paid for completely by Canada. The Prairie network, funded partly by the U.S. and Canada will cost about \$164 million. Canada will pay one third, U.S. remainder.

► Second English Electric P.1 supersonic fighter made its first flight just a week after the original prototype flew. English Electric chief test pilot R. P. Beaumont flew both models of the P.1 preceded by a jet of Supersonic Interceptors.

► Dr. Harald Cyron, a turboprop designed to power supersonic fighters, has made its first test flight in a Short S.4 Sparrow bomber rigged as a flying test bed. The Cyron is now flying in the lower engine in one of the four two-seat Short nacelles. Later another Cyron will replace one of the standard Avons in the lower portion of the starboard nacelle.



TITANIUM helps lift the C-130 higher and faster...with heavier payloads

Titanium is an essential material for high-performance aircraft. On the new Lockheed designed Air Force C-130 turbo-prop medium combat transport, titanium's high strength-weight ratio...exceptional resistance to corrosion...and freedom from stress corrosion cracking, play a vital role.

Lockheed uses REM-CRU A-55 and A-70 extensively in the C-130's power plant enclosures—fire walls, shrouds, ribs, longitudinal, and

skins—where outstanding properties are needed at elevated temperatures.

REM-CRU, pioneer in titanium alloys for advanced aircraft applications, has substantially expanded its facilities. Now you can be sure of the availability of the REM-CRU titanium grades, sizes and shapes to meet your needs. For help with application or fabrication problems, REM-CRU's engineering staff is always at your service.

To keep abreast of the latest developments on this and related subjects, write to Dept. 48, the Rem-Cru Review—a free periodical presenting the latest technical data on titanium alloys.

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Washington Roundup

Engineer Shortage

Airline shortages of research and development personnel were reported by the majority of aircraft manufacturers surveyed by the Bureau of Labor Statistics for the National Science Foundation. Situation described by practically all of the major aircraft manufacturers surveyed by the BLS survey of 200 industrial firms from December to the conclusion of the survey indicated considerable difficulty in recruiting qualified engineers.

"Our organization has been forced to 'borrow' as development work by its capabilities of qualified personnel." Shortages of electrical engineers, physicists, metallurgists and qualified supervisory personnel for research and development projects were also reported by aircraft companies surveyed.

British Security Relaxes

Britain's military security laws have relaxed to permit more information to be available when a new aircraft or equipment comes off the production line for general publication. Unofficial pictures and data disclosure from those pictures are now permitted as general publication by British government and ministers. The regulations will remain in effect until 1970. In December, if further changes are necessary, British security officers raised the hope that coders will check with their colleagues if they think they are getting into noncompliant areas.

Atomic Plane Progress

Rep. James Patterson, a member of the Joint Congressional Committee on Atomic Energy, reports that atomic scientists are on the verge of a major breakthrough in development of an atomic aircraft. The program cited by Patterson is believed to concern new lightweight methods of shielding, although it is not certain what major progress is also being made in developing a practical atomic aircraft propellant. Patterson approaches Congress, site of the new Pratt & Whitney aircraft engine research facility.

Propriety Regulation

Rusty has a new Air Force regulation, operational with minor revisions, that AFM 10-66, dated July 14, is "a general standard of conduct relating to conduct between private interests and official duties." Published in the era of congressional probing into reports that Air Secretary Harold E. Talbot used his USAF knowledge and power to promote business for Michigan & Co., the page 150 regulation makes it clear that all personnel and "publicized" users using their military status in connection with any commercial enterprise. Regulation is signed by Gen. Nathan R. Twining, Chief of Staff. "By order of the Secretary of the Air Force."

Moral Bargain Rate

More transportation funds given by U. S. Air Force to 200 flight instructors of the Moral Re-Affirmation movement was not sold through regular channels. The conclusion of Congresswoman Defense Secretary Wilson and Air Secretary Talbot got their C-130 transports activated in the job of taking the group from Miami to Geneva at the special government rate of \$325 an hour

per airplane, as opposed to the normal civilian rate of \$775 an hour. USAF's Commandant Balloons Division at the Office of Information Services, which ordinarily handles such requests, gets blamed for failing in the course of a year and two months to bring along why USAF does not train civilians to fly civilian with no national defense mission. The office was last heard of the MRA deal until the story broke in the press.

Bilateral Pressure

Senate Interstate Commerce Subcommittee hearings on bilateral air agreements have gone rapidly in the brief course of congressional work—the Georgia bilateral Sen. George A. Smathers (D-Fla.) got Civil Aviation Board Chairman Ross Rader to admit that the Board decided to be more liberal with the Gomaco after State Department urged it to reach agreement. But word is that the CAB still thinks U.S. carriers aren't home free when they file their own.

The hearing concluded that greater responsibility for determining what routes should be traded in bilateral negotiations lies with the CAB, and the State Department's and first State except CAB findings. Both federal agencies protested that they should act in the interest of their "best" the airlines. The airlines are hoping that some defense formula for closer consultation between the industry and government so bilateral negotiations will move out of the hearings.

Locos Dropped

Wright H. Lucas has been dropped by the White House as a representative for Civil Aeronautics Board Member. Lucas, who had been a spokesman for passenger railroads (AW July 15, p. 1) brought his pressure from Dallas against the Kansas City congressional, who in June Fort Worth and led the successful congressional battle for funds for Kansas City Airport.

Airlines Shop for Jets

Most airlines were reported near a plateau last week in purchases of jet transport aircraft. Boeing Airplane Co. and Douglas Aircraft Co. necked to announce the first U.S. commercial jet transport sale "within a very short time."

Airline executives, such as Jim Tippie of Pan American World Airways, was described as "consulting" between Seattle and Santa Monica to look over the Boeing 727 jet prototype and the Douglas DC-8 drawing board design.

One manufacturer's spokesman said negotiations had reached the stage where "the airlines are traveling back and forth trying to beat the other down."

With Boeing and Douglas salesmen working overtime as jet transport pitch, Lockheed Aircraft Corp. was continuing a strong sales campaign for its forthcoming Electra. Lockheed last week met with top officials of Western Air Lines to present its Electra design.

Sid W.A. President Terry Donohue: "We might be interested in turboprop."

—Washington staff

Red Far East Air Buildup Continues

ROK air force chief worried with only two wings of F-51s and F-86s facing 300 MiG-15s and 100 B-26s.

By Claude White

Souad, Korea-Between 7,000 and 8,000 Communist planes—mostly a third of all Red combat aircraft power—were based today in the Far East and the western part of the ROK's line of defense. But that is not sufficient capital only a few weeks from the pending emergency.

Gen. Li Gao Kun, Cheng Yen, chief of staff of the air force of the Republic of Korea, expressed serious concern over the fact that his air force will be standing alone by the time the U.S. Air Force is scheduled to withdraw in early 1957.

Raising a change in the political situation, Gen. Son will be forced to consider this with the factor:

- One wing of F-86 Mustang piston-powered fighters.

- One wing of F-86 Sabre jet fighters. Only five of these planes are now here and the rest will be delivered in late 1956.

- One squadron of C-46 transports. Six have been delivered.

- An AC-47 gun plane.

According to Gen. Kao and sources at Far East Air Force Headquarters, in Tokyo the Red buildup in the Far East has been marked by a gradual shift of its power from Manchuria and North Korea to the area around Formosa.

USAF to Escalate

Striking back Gen. Kao's forces today, FEAF has the strategic defense of the area as its prime mission. If it is noted that USAF plans no evaluate most Japanese bases at least by 1960. Most of these are used by Lt. Gen. Rawls' 5th AF with headquarters at Nagoya.

To meet the South Korean defense needs, one USAF wing and one, Gen. Kao, are to receive at least four F-86 fighters each. He will have half the strength if he can find a way to replace his F-51 fighters with jets.

Gen. Kao, 59 years old and a graduate of the Japanese Military Academy does not feel any cause because the Formosa area is held to be the last line of Red air power in the Far East. It has been pointed out that in most of us, USAF bases on Formosa, Okinawa and in the Philippines could be immobilized by atomic attack.

In this case, bases in Japan and South Korea would give the American planes their only possible haven within

striking distance of the areas still surrounded on the Chinese mainland.

Gen. Kao puts emphasis not only on his need for combat aircraft, but also on the related fields.

- Since less than about 30 ROK aircraft have been turned in at reconservative by USAF, to keep up with them until the time when ROKAF has a solid total number of the new ones, they are turning over USAF aircraft on the 7th AF planes.

- Major highway activity for USAF

- Since all planes are pulled out of Korea will be continuation of a new construction program to turn South Korea on the reconstruction and operation of road and communications equipment, including a radar warning network.

Strategic Bases

USAF's 1st AF Adjutant Group, headed by Col. Von H. Shulman, serves as the liaison between USAF and ROKAF Command, most of its work is concerned with the supply of basic war essential to Gen. Kao's operation. Five wings and six squadrons in maintaining the tactical wings, and will soon manage major theater problems and the theater command.

By 1957, the new wing will change. When USAF leaves South Korea in early 1958, the adjutants will return, along with a marching staff to wind up the communications program.

So far as strategic air power is concerned, Gen. Shulman adds that the only permanent base for B-36 and B-47 bombers on site, in the Western Pacific, is several thousand miles off the coast of Japan. This reporter has seen enough USAF base construction activity to recognize that SMC dispersed and mobile striking are major factors in the Far East plan.

A Japanese spokesman, whose name has not been confirmed by FEAF, has informed us that USAF will give up 50 of its 60 bases in Japan. At least five of the 60, he said, will be improved to accommodate long range bombers.

This announcement would appear to have resulted from growing Japanese protests over USAF base expansion that would require demolition of native farms from land that has been worked for generations by the same families. FEAF has recognized this problem and sought the government's aid in solving it.



Talbott Quits Mulligan, Clings to USAF

By Katherine Johnson

Washington, D.C.—Talbott, as Secretary of the Air Force, has left the vice chairmanship of Paul B. Mulligan & Co., who also has President Eisenhower's complete endorsement of the office he had in Talbott's partnership in the New York brokerage firm of Paul B. Mulligan & Co.

President Eisenhower's decision is expected soon in an atmosphere of growing press clamor for Talbott's resignation from the top USAF post. The President made it clear at his weekly press conference that although he felt no law had been violated by Talbott, these were ethical violations that are not eligible for pardon.

Talbott is expected to get a clean bill of health in the "rights" of his action on behalf of the Mulligan family from President Eisenhower and the Senate Subcommittee that is preparing his defense, likely to be fully defended during the presidential election campaign of next year.

In a subcommittee report, as an initial opinion, members of the Senate subcommittee we expected to continue Talbott's

a participation in procurement of a

contract with Radio Corp. of America by the Mulligan firm.

• Activities in soliciting business for the Mulligan firm.

• Paul B. Mulligan, Adjunct Vice Chairman of the Mulligan firm.

On the termination of our contract with RCA in the fall of last year, Mulligan made it a point to obtain a second contract. Early in the negotiations, Talbott telephoned David S. Schaffell, chairman of the board of RGA and its legal counsel, to give the way for Mulligan. Talbott insisted that his understanding was that the contract was to be with a "second" division of RCA. Other divisions, including SMC and Ewing, received by RGA, and John Johnson, General Counsel of the Air Force, assisted in this view, understanding that the contract was to be with engineering divisions of RCA dealing with electronic hardware for the Air Force.

In January, Mulligan reported to Talbott that RGA ultimately questioned the ethics of a contract with a firm in which the Secretary of the Air Force was a partner and had reported a raid by Attorney General Herbert Brown-

Talbott's Income From Firm

Below is the gross annual income of the Paul B. Mulligan & Co. since its establishment, showing the allocations between the two partners—Secretary of the Air Force Harold Talbott and Paul Mulligan—as presented to the Senate Permanent Investigating Subcommittee by Mulligan.

For Year Ended:	Gross Income	Mulligan	Talbott
Jan. 31, 1948	\$10,000	\$21,575	\$1,417
Jan. 31, 1949	94,521	20,317	4,813
Jan. 31, 1950	245,180	50,718	21,918
Jan. 31, 1951	249,000	57,802	42,982
Jan. 31, 1952	318,986	71,264	60,264
Jan. 31, 1953	218,880	87,365	42,785
Jan. 31, 1954	405,386	90,715	63,379
Jan. 31, 1955	411,990	81,632	46,668
Total	\$1,653,271	\$497,398	\$236,475

Talbot Reaction

Secretary of the Air Force Harold Talbot's activities to promote the business of Paul D. Maligne and Co. have become a major political concern.

Two leading newspapermen—Associated Press reporter, the New York Times, the Washington Post and Times Herald, and the Los Angeles Times.

Sen. Wayne Morse (D-Ore.) is a speech on the Senate floor paying his "homage" to Talbot declared: "Gen. Talbot will not be clean until we can clean out of it men who have an private appreciation of their chief's intelligence in respect to conduct of interests that men such as Mr. Talbot."

Paul Ballek, chairman of the Democratic National Committee, stated: "How you there be one doubt as to the use of Mr. Talbot's office for personal gain? ... if anything is going to be done to reduce Krushchev pressure to maintain stability in government, it is up to the President to act promptly in the public interest."

Well before proceeding, Talbot summoned USAF Counsel Johnson to his office and a call was placed to RCA Counsel Ewing. At this point the interview began:

"I had an subpoena this afternoon. Talbot did not recall the episode."

Under close questioning, Ewing stated in his testimony that Talbot had told him RCA should "get off its high horse" and stop being so high and mighty," and pointed out that "12 or 15" other firms with defense business had Maligne contracts. He was forced AYCO, General Aviation, and several others, having said:

"Johnson testified that the telephone conversations did take place and that Talbot recited it after he (Johnson) had advised him—Talbot later confirmed by Talbot's brother, Talbot was Johnson recommended Talbot's manufacturing firm with defense or Air Force business having Maligne contracts. Talbot gave as the reason for the call in listing his concern at losing his integrity disclosed.

Johnson finally disclosed an opinion upholding the legality of an RCA contract with Maligne, in view of Talbot's connection with the firm and submitted it to Brewster.

Brewster and later told Talbot that "it would be against our policy to give my opinion to an outside private concern like RCA."

Messengers and letters from the file of the Maligne firm made it clear that since the time Secretary of the Air Force Talbot has continued active in that role. From incrimination in the case

Russian Aircraft Pictures



TU-104 cargo, codenamed Hone, a world's largest cargo-type aircraft is built by Pavlov's 3115 series. Two strutting engines drive this unique design.



TU-95 extending air-craft price and prime motor shows cargo capacity of cargo compartment is fully covered, nose and tail sections are world-drawn.



TU-16: Two heavy bombers of Tu-16s. Total number consists of least 40 or more.

opponents included Avia Corp., Elvira Arikile Co., British Lamp, Hamble Co., Oba Industries, Sperry Corp., Canadian Airlines, GKNM, Northern Chemie Co., and numerous others in dochasing the procurement from the Maligne firm. Talbot said he doubted if he had directed "Two and a half days out of me two and a half years to the point of assault contrary to the recommendations of the staff."

When Talbot's memorandum to be

AVIATION WEEK August 3, 1968

Which Pentagon Conceals



HADGER this runs over Tu-16s, flying off lines of Soviet's in-service medium bombers and primitive copies with Boeing B-57; lower figures have been built.



HADGER bottom cockpit wing, lower, two large turboprop aircraft in landing configuration.

Secretary was up for Senate confirmation early in 1953, he testified that a formal agreement had been made "we want to be alone (for the Maligne partnership) while I am in Washington and you do with defense work elsewhere."

Under questioning, Talbot said that he has never directed the purchase of assault contrary to the recommendations of the staff.

It was developed at the Senate hearings that 90% of the business of one Maligne client—Avco Corp—is con-

cerned, upon receiving his organization, it was found that most of the work was to be dealt with in the same area. Consequently, we are writing a standard 12-month contract to cover all of Avco."

In view of Avco's substantial amount of defense work, Senator reported raised the question as to whether it should not have been considered as being "concerned" a defense contractor. Avco was recently awarded a rate in the USAF Atlas missile program.

The aircraft items figured in the Senate hearings:

- Douglas Aircraft Co.
- Convair Division of General Dynamics Corp.

Talbot confirmed a report by George Gelli, Washington representative of Douglas, that he had mentioned the work of the Maligne firm and his connection with it to a session with Donald Douglas Jr., president, and Donald Douglas, Sr., vice president, and Gelly Gelli October.

Gelli reported to the subcommittee after an exchange of greetings. Mr. Talbot showed a newspaper.

I could tell he enjoyed it. In it he was in to Mr. Talbot that I have seen nothing in the paper recently that he had said that when we have been in his office and had great responsibilities on his mind as secretary, that he would start in and talk about them to Mr. Douglas, without any relationship whatever ever to the business we were going to discuss.

"He maintained that he had some relationship to a management engineering concern and that it was a good business, that it was to make more invention of various kinds, but he also, in the course of it, mentioned one company which I can't remember, Bartholdi Oil Company, as being one of the clients of the company.

"Then he looked up all of a sudden while he was engaged in that conversation, and was on remarks coming from Mr. Douglas Sr. or Jr., and he said, 'Why, perhaps I should mention that in your presence.'

"When we left the office and had gone out of the hall I made the comment, 'I wonder what is the hell the Secretary thought up to talk about?' In a subsequent meeting Talbot again made a protest that he had no contact with the right rear that Douglas could connect with the Maligne firm.

Toriborg that he had never approached anyone regarding his business. Maligne referred to the subcommittee that he had no contact with D.T. Talbot, controller of Convair. Maligne said that the session was not for business purposes and that "I really explained I could do no business (with Convair) it was a get-together meeting."



VORTICE GATES which hedge constitutes torque of the propeller is shown just behind cockpit in the first flight photograph of the XF-84H.

Republic XF-84H Makes First Flight

Republic Aviation Corp.'s starboard-powered XF-84H, designed as a super sonic propeller fighter, took to the air during a series of acceptance flights made over four flights at Edwards AFB, Calif., July 23.

Company test pilot Henry C. Bassell, Jr., said that the XF-84H exhibited good takeoff and flight characteristics in its initial flight, despite which the plane went up to 30,000 ft.

Bassell, in his speed, range and altitude tests, came home loaded while operating from very short runways. Republic states that the XF-84H needs runway lengths for a USAF fighter-bomber or Navy carrier-based day fighter. However, company officials have ruled no takeoffs beyond three minutes. It is claimed, however, that the statement is based on company experience as yet lighter-bomber designs, rather than as an actual official current or future design specification for a turbo-prop powered airplane. It has been reported that the plane would undergo service trials (AW, May 1, 1954, p. 11).

Pilot-report of the XF-84H is a 5,850 shp Allison XT49-A1, designed to take an afterburner. This is believed to be the first time a turbojet engine has been designed for such power and weight.

For its testbed, the fighter's nose section gets four kinds of the nuclear aircraft's fuel mixtures of different power settings. One of these sections mounts the three-blade Aeroflex electric propeller. Right now, soft fuel will be made in the future using Concas and Hawaiian Standard propane.

The single-seat ST-51 has been built from the start for its operational duties and is not a conversion of an existing F-84 airframe, although it may

use some F-84 components. It has the RT-54's folding swept wings and leading edge engine air intakes. An extra thick skin section is also used, plus flaps along the trailing edge.

Another design highlight is the center-winged tail. The F-84's variable pitch propeller has been replaced by a fixed pitch propeller which can be folded back to help reduce the torque required to lift off the aircraft.

The supersonic propeller has several pitch control features that Republic points out as making the XF-84H suitable for tactical use. An automatic prop governor maintains constant engine airspeed until a slat of slats of aluminum will chromosome more power and much fueling.

Gross said that to open certification by Civil Aeronautics Administration, Lockheed will stage three of the first flights in simultaneous flight testing.

By late 1956, if our sales forecast materializes, he said, we will have 100 aircraft in the air in 11 months." The Lockheed spokesman added that the Electra design "permits" use of the Allison 501C engine but she could use turboprop engines of greater horsepower for even higher speed.

The 164RA will be the fastest long range aircraft in the world when it is introduced, Gross said. One new model 164RA, we believe, will be the first aircraft that can carry a full quasi payload against average rear-around headwinds from New York to Europe (airline) in less than 10 hours.

(Lockheed's 10-hour figure gives this comparison between the 164R and the Douglas Aircraft Co. DC-10. That firm is New York against a water barrier, but the 164RA will be able to fly at about 372 mph, compared with 285 mph for the DC-10.)

The Lockheed president said the Electra does not question the needability of prop jet transports but he believes the market for jet at present is more limited than the one expected for the Electra and is going to be more competitive.

"Actually," Gross said, "We believe the Electra could well be required in the greatest quantities of any first-engine transport jet produced for commercial use."

Electra schedule calls for first flight in October 1957 and first delivery 18 months later, or 18 months after American entry into the AW-55 program (AW, June 13, p. 12). AW-55 plans are due for delivery in June 1958.

He said that the Electra's almost straight cylindrical fuselage and single vertical tail will result in easy production. In addition, straight wing surfaces avoid use of a slat of slats of aluminum will chromosome more power and much fueling.

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AIRPORT WEEK, August 1, 1954

Guided Missiles

By Gerald Schleske

Dilling, Germany—Results ongoing from earliest to latest are reported by officers who conducted the "Sandarm" firing trials of Matra TM-81 Matador missiles in Libya in June. Eighteen of 20 rounds delivered to the firing pads of the 1st Technical Missile Squadron passed the final "go/no go" test.

Reliability of the Matador from initially through launching to target was not entirely accomplished. See Matra were fired last Oct. in Libya in June. Eighteen of 20 rounds delivered to the firing pads of the 1st Technical Missile Squadron passed the final "go/no go" test.

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The 16th Technical Missile Squadron, also part of the U.S. 12th Air Force, and the other missile unit based in Germany, did not participate in Libya, being told it did not provide enough on the instant "Carlo Blaschke" maneuver under extremely unfavorable weather conditions with dry fire arm and cloud cover.

These maneuvers proved the excellent reliability of the weapon and its ability to be self-sufficient and follow through with in-time launching schedules under most difficult conditions.

Iron Curtain Range

Rome, Italy—Matador is classified as a strategic weapon and the公社的 weapon, but it is said, to be immune for several hundred hours, bringing up a deep well of Iron Curtain territory within reach.

In a combat situation, target and type of warhead selection would be made by high headquarters. Weapons are adaptable to several types of targets.

Transport vehicle comes in assembly as well as transporter trailer to transport. Also with mobile maintenance trailer, transport and probe electrical charge to conduct with the missile which launch area with wheel-mounted probe until do final check out.

Launching Sequence

New case with warhead and the fuse bottle are added at launching pad. Last step taken only connects while the complete assembly and conduct launching of missile at the launching pad takes somewhat under one hour. After missile is ready for firing, but not held ready for some time but not for ever more electronic equipment might burn out.

At final go signal, missile is airborne within minutes, as soon as heat check on electronic guidance and ball is completed.

Launching technique centers on very long launcher. First the jet engine is started and gradually brought up to 100% power. Missile is mounted in a hold back hole. At critical time Roto jet fires plus jet power from the tail, arborizing missile. Roto carries missile well beyond aircraft starting point, then the drogs and switch fire on own. Afterburner.

Control of the Matador consists of electronic guidance, shift switch and target selection via a control panel that completes electronic check and guides missile.

Crew of target selection uses a panel with T-33 jet trainer killing essentially same electronic brain as missile itself. Each launcher has one own hydraulic, electric and fuel system. Number of 60 lead generators used by squadrons for power and communication is slightly staggering but classified. Complex WEPERM system to each launching site to squadron's combat operational needs.

Simple Maintenance

Maintenance apparently is no problem here. Actual rate of maintenance is "very low" since missiles are never flown except in combat or tests. Thus there is no wear and tear on parts. Once the missile is assembled, checked and put into commission, its flight life is excellent. Only periodic checks are necessary to ensure reliable ready condition.

Missiles pass the recycling tests without fail in most cases. Climate that is not in a factor in extended usage although long term in the Arctic might cause problems. The unit and some checks in Africa in in Germany and not well set up.

Missiles are dropped from U-8 in following pairs under suction holding.

F-101, 104 Will Be Accelerated

Production of an all-weather intercepter version of the McDonnell F-101 Voodoo and an advanced model of the Lockheed F-104 jet fighter will be accelerated without appropriation of extra funds by Congress.

Output of the F-101 will be speeded beyond the original schedule and initial output will be earlier than was planned. The new model of the F-104 will incorporate improvements resulting from test flights plus evaluation of the General Electric 179 jet engine. F-104 prototype aircraft has been powered by the Wright J65.

Both the F-101 and F-84 are well

AIRPORT WEEK, August 1, 1954

with the experience with the quickly changing fleet. March 15 to March 2 USAF's need for such aircraft has been confirmed, thus giving it the original technical picture of the Rantan as it stands, which also resulted in accelerated production of the Boeing B-57 long range jet bombers.

It was made clear that decisions to emphasize the interceptor version of the F-104 will not interfere with plans to award a contract for another long range interceptor. Decisions on this competitive bid is expected this summer and procurement action is known to be at the hands of Air Force Secretary Harold E. Talbott, awaiting selection.

Board Fixes 33 Stops For West Coast Line

First order of permanent certification of a local airline has been issued to West Coast Airlines by the Civil Aeronautics Board.

The CAB issued 25 of West Coast's points for permanent certification and 5 points for temporary certification under

the traffic priorities previously announced by the Board as a measure of passenger load for such aircraft as has been completed thus far by the original technical picture of the Rantan as it stands, which also resulted in accelerated production of the Boeing B-57 long range jet bombers.

The point system certifies 25 stops of traffic over local routes within Trans-Texas Airlines and Southwest Airlines—now being promoted separately because these removal proceedings were nearly complete when the certification legal suit was enacted.

First Step

The West Coast plan now begins as the first step in an accelerated certification program outlined by the CAB in June after Congress divided the federal aeronautics board into permanent operating authority. Objection to the order must be filed within 10 days, and hearing will be held limited to removal of traffic rights.

Under the law, the route decisions to be made by the CAB concern the status of the points earned by the local service airlines. The law requires the Board to give permanent status to all financial points and at least half the intermediate points served by each car-

CAB set a maximum of five passengers explained per day (about 300 a month) as a reasonable justification for permanent.

Tacoma Excluded

Applying this rule, the Board proposed to grant permanent certification for 25 of West Coast's points. A transitory three-vote certificate is proposed for eight of West Coast's intermediate points which don't meet the five-a-day standard.

The order does not include Tacoma, Wash., in the certificate. West Coast's present certificate names Tacoma as a point, but the airline has never used it. The CAB concluded that such a point is not eligible for inclusion under the new law.

Points served by West Coast include commercial, veterans' and military points earned by enterprises not included in the certificate, but the Board feels that the new law doesn't provide for an expansion of traffic in certificate in the present certificate.

The CAB has emphasized that the question of permanent or temporary certificates will have no effect on service to the points in a carrier's certificate. All points will continue to receive the service they presently enjoy, but those points with temporary status will be subject to review in three years to determine whether they can economically support local service.

Defense Sets Engine Export Rules

U.S. jet engine manufacturers cannot sell their new power units to foreign airframe or defense firms producing aircraft unless they are four years old, according to a new Defense Department directive.

Following long and heated debate of American-engine builders to banish the security wraps that have imported commercial and foreign sales, the department has defined a "phased release program" for guidance in distributing information "so that adequate time can be allowed for adjustment."

In the meantime, the directive makes clear, the Navy or Air Force will decide whether data can be released. Changes in the international situation may postpone or extend release of data about a particular engine.

Recognizing industry efforts to facilitate commercial and foreign sales, the directive says the program is designed to assist in the placing of commercial sales to non-US markets abroad.

In the following schedule, data marked (A) can be released on completion of the 30-hour preliminary flight rating test. Data marked (B) can be given to commercial propellers when the aircraft has been approved the 100-hour endurance qualification test. The numbers are hours in years:

	A	B	C	D	E
Security	Security	U.S.	U.S.	Europe	Europe & Japan
Closed	Closed	Author	Author	Author	Author
U.S. Aircraft	for Comm.	Foreign	Airplane	Manufact	
Manufact	Air-	Open	Air	Manufac-	
tares	line	line	line	tories	
1. Preliminary performance & stability data	(A)	(B)	(B) plus 1	(B) plus 1	(B) plus 1
2. Complete performance & stability data	(B)	(B) plus 1	(B) plus 3	(B) plus 3	(B) plus 3
3. Engine delivery for prototype aircraft. (Operations and maintenance data only)	(B)	(B) plus 1	(B) plus 2	(B) plus 3	(B) plus 3
4. Engine delivery for production aircraft & drawings to reflect ...	(B) plus 2	(B) plus 2	(B) plus 3	(B) plus 4	(B) plus 4
5. Production and maintenance drawings	—	—	—	—	(B) plus 4

Metal Blades Tested For Two Helicopters

Introduction of all metal rotor blades on the Bell 101D and Sikorsky H-21 helicopters is likely in the near future pending the result of efforts to reduce manufacturing costs.

USAF's Air Research and Development Command said successful flight and wind tunnel tests have been conducted at Wright Air Development Center on the new experimental metal blades.

A 6-ft spur blade designed and built by the Fairchild Corp., Tritec City, Michigan, the spur forces the leading edge of the blade to which shearworn slots are fastened to form the air section.

A 6-ft leadtail metal blade produced by the Helicopter Division of Bell Aircraft Corp., Ft. Worth, Texas.

ARDC said the new blades will be stronger, lighter and more precise than wooden blades. Major point in their favor is reduced weight/haftload, making it possible to replace a single damaged blade without installing a whole new set of balanced blades. Production and maintenance costs also will be reduced, according to ARDC.



Dependability

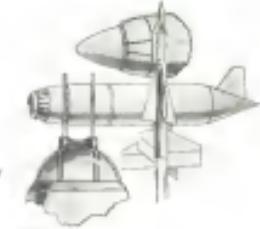


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Senators Are Hurrying Second Airport Plans for Nation's Capitol

SENATE COMMERCIAL COMMITTEE issued no permit on construction of a second airport for the nation's capital in the last session before the adjournment of Congress.

In view of the increasing congestion at Washington National Airport, there was general agreement to hurriedly before Commercial Aviation Subcoms voted on the urgent need for an additional facility.

Senators were skeptical of the Ad committee's plan, presented by Charles S. Knobell of Commerce for Transportation, John Bethesda. Under the Bethesda plan, joint construction of local government-Maryland, Virginia District of Columbia, a construction would take the initiative to finance so "partnership" after the action of the Port of New York Authority to finance 90% of the cost of a second airport by bond issues bearing 5.5% interest. The federal government would make a grant to assist the remaining 9% cost. The authority would purchase Washington National and operate it jointly with the new airport.

Senators Object

With no increase in user fees at Washington National, now "totally inadequate," Bethesda and the joint operation could be a losing proposal.

He said that the fee losses at Washington National are "inevitable" regardless of the second airport size.

The main objection raised by senators to the Administration plan is that it would take too long. Before the local governments could agree on a proper and state legislature passed

the necessary implementing legislation, Commerce Committee Chairman Sen. Walter J.知悉 (D-Wash.) informed that it would be three to four years before construction could get underway. Sen. Frederick P. Chase (R-Mo.) agreed.

Magruder also objected to the payment of \$35 million, asking "why should someone rating out at Seattle ought money from a regional airport?" He argued that a direct federal appeal for construction of a second airport would not only make possible quick construction, but would not eat the additional cost for the authority. Magruder visualized that if the Ad committee would propose that it start a second airport the Congress would quickly approve them before adjourning.

New Airport Head

Carl Antonovich, Board chairman, Ross Rabkin, took no position on the plan presented by Bethesda. His influence largely stemmed the way for a second airport.

"An earlier study at Washington National has already reached the point where a third runway is a question of when, not if," he wrote. "The economic growth of our transportation system and use of Washington will be hastened by lack of support facilities. Friendship Airport can offer a slight edge to this situation, but we do not believe it is the answer. Accordingly, the Board is of the opinion that a second airport for the Washington area will be necessary in the near future if the full advantages of air transportation are to be realized."

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PHOTO BY TAKI SHOWS REPUBLIC RF-84F
TO AIRRIGHT UNDER GRB-36 CARRIER

USAF Testing Ficon Combat Readiness

Combat readiness of USAF's radical Ficon concept will be tested by the unpaved GRB-36 pictured on these pages operating with a tactical operational Republic RF-84F reconnaissance fighter.

The trials will mark the first time the new configuration has been paired, either alone (AW, Aug. 11, 1953, p. 125) or made with a KB-50 MO and a YRF-84.

The series GRB-36 has imposed no gear and bomb bay landing doors designed to speed the aircraft's launching and retrieving.

Tests will include launching and recovering during day and night at three types of weather and at varying altitudes.

In night recovering, the pilots agree to make on a runway and a set altitude. The fighter pilot keeps his plane up with the bomber's navigation lights. The GRB-36's bomb bay is illuminated and a spotlight prepares the carrier's trap, which is engaged by a retractable hook on the fighter's nose.

The Ficon concept is designed to allow extra long range high-speed aerial reconnaissance and nuclear weapons delivery with maximum economy.

The U.S. Air Force has activated its initial GRB-36 Strategic Reconnaissance Wing, the 99th, at Fairchild AFB, Spokane, Wash. The unit will be trained with Thunderbolts of the 9th Strategic Reconnaissance Squadron, Great Falls AFB, Mont.

Contractors are to convert earlier GRB-36s into the new improved configuration.



1. SHANT CONVAIR GRB-36 DIRECTOR aircraft stands nose-down on its landing platform in ready Republic RF-84F "prowler." This is first use of a turned RF-84F in Ficon trials; previous tests used a prototype Thunderbolt.



2. USAF IS HOSTED via GRB-36 Thunderbolt has a retractable hook atop its nose.



3. SHAD UNDER GRB-36, XF-84F "prowler" aircraft takes off. Reconnaissance fighter's tail fin was cut to Convair's hook top.



Air Forces give McDonnell's new debutante a big rush!

TEMCO HELPS PRODUCE POPULAR F-101 VOODOO

When the F-101 made her first public bow, she was already a much sought after girl. Designed as a long-range fighter, the Voodoo will first be assigned to the Strategic Air Command to escort our jet bombers, but interceptor and tactical air groups also see exciting evolutions ahead at this big raw jet. Reportedly the most powerful fighter in the world capable of cruising at well over the speed of sound for hours, she is wanted for defense against bombers and for use as a supersonic fighter-bomber.

To facilitate production of this important plane, TEMCO was called upon to fabricate aft fuselage sections. The award of this contract indicates the thoroughly satisfactory manner in which TEMCO has been handling work on another McDonnell fighter, the F3H Demon, and further establishes TEMCO's reputation for producing a quality product, on schedule, at the lowest possible cost.



Fuselage assembly and inspection of aft fuselage section of F-101 prior to delivery to McDonnell.



ENGINEERS: If you are interested in a position with a growing weapons systems organization, write full particulars to E. J. Heron, Jr., Engineering Personnel, TEMCO Aircraft Corporation, P. O. Box 6191, Dallas 2, Texas.

AERONAUTICAL ENGINEERING



BY ADJUSTING CONTROLS on side of NACA T-36 cockpit, pilot can simulate flying characteristics of plane off on the drawing board.

Variable-Stability Planes Preview Future Handling Characteristics

By William J. Coughlin

Moffett Field, Calif.—In one of the nation's most unusual flight test programs, National Advisory Committee for Aeronautics is trying to study the stability and control characteristics of aircraft not yet out of the drawing board stage.

This is made possible by the use of test aircraft whose stability can be varied in flight to simulate lateral and directional characteristics of other aircraft, even those which have not yet flown.

The 196 aircraft, intermediate F-86A and North American F-100A, are being used in NACA's effort to probe the increasingly critical stability and control problems of supersonic flight.

Other work on variable stability aircraft is being done at Cornell Aeronautical Laboratory. CAL's current program involves flight tests of a Lockheed F-94A and a Douglas D-55 to develop criteria for handling characteristics of classes of aircraft. Earlier CAL work was done with a Grumman TBF's.

At the recent Ames Laboratory meeting,

the test aircraft the same stability differences which would be brought about by aircraft changes in configuration.

Then, it is possible to figure out, for example, the effect of a larger tail on stability.

NACA researchers have long felt that if one can predict the effect of a larger tail, it is possible while holding that constant to proceed in increments of size, a change is desired. Thus, by adding servomechanisms to affect other stability derivatives, the researcher can, within limits, simulate the handling characteristics of an entirely different aircraft.

Step-by-step, the aircraft can be "re-designed" so that it has like something else. In a recent series of flights, the cockpit of the F-100 was the pilot's own house with an airplane that then connected him to a Lockheed P-38, a North American F-100 or even a Convair B-58 supersonic bomber. This can be done in flight.

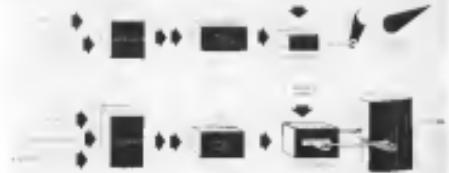
Obviously, there are limits to such changes. It will never be possible to change an F-86 so that it handles exactly like an F-100. But if it could be changed enough so that it handles more like a Super Sabre or a Delta-



VAMES on Helio's right wing provide stability signals to variable-stability system.



HECAT STABILITY SYSTEM collects both aileron and rudder deflections. Rudder position info plus input to aileron, aileron, yawing roll rate input can be fed into stabilizer.



SIMPLIFIED DIAGRAM shows how aircraft in variable-stability aileron/rudder system

roll, or constant moment dragons creating characteristics.

That's an issue of the theory that an aerial engineer can be used for:

- Prototype simulation. The aircraft can be set up to match the predicted behavior of a prototype. This has been done in the case of the B-58, for example. While the B-58 and the F-106 can not capture all the characteristics of a supersonic aircraft, they can simulate certain dynamic and transient characteristics.

• Design studies. The predictable unpredictable behavior for a large class of future aircraft can be explored, without building any of the aircraft. "It will give the designer a little feel for what he will have to watch out for," says flight research engineer William Kauffman. Advantage over computers here is in actual flight testing.

• Test and development of stability augmentation. Since the research use of the variable-stability aircraft has proved to be the technique most in favor in making an unstable aircraft with stability augmentation and new designs, much of the program is applicable to the design of these items. The variable-stability equipment used on the Bell aircraft is in effect a powerful and versatile stability augmenter. Aeronautics, in fact, often uses the equipment in flight to explore the inherent characteristics of the B-58 itself.

One of the aircraft is not limited to NACA goals. More than 40 NACA aircraft and military pilots have logged more than 400 hr in the variable-stability aircraft.

Typical Program

This is how thus plane is used in a program of prototyping/stabilization for a customer:

The aeronautic designer decides the size of his design—say, let's say 100 ft—when he believes him to be free to do so.

The contractor's test pilot and management next come to take part in the research program. The variable stability aircraft is set up to match the predicted aircraft behavior. In doing this the aeronautic designer does not face a vacuum background of actual flight experience, together with the designer's own capabilities.

The aircraft that is "used on" in flight to match even other data. At times results of the flight test program have matched exactly using computer predictions.

During a three to five-day program, the contractor's own test pilot flies the aircraft under stress and returns back to the contractor on the flights. This has the added advantage of establishing a test pilot to become acquainted with the perhaps unusual handling qualities of the prototype which he later

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PART OF V-S DRIVE MECHANISM is housed in base of F-86A's fin. The nose which generates roll-pitch signals in the system is positioned beneath the empennage inlet lip.

will take up on its first flight.

At least one company pilot reported back to Ames researchers that on the initial flight of a new supersonic aircraft he recognized banking characters too steadily experienced on the Ames variable stability aircraft.

This was the value of having the pilot in handling the prototype aircraft, it flies," says Kaufman. "That is, within the limits of the characteristics which are being studied, it gives the pilot a familiarity with regions of undesirable behavior."

In some cases, there may be no attempt to match the exact strength or speed of the response. In other instances, a company wished to know the effect of roll-pitch on the pilot in a new design with the control located forward. It is impossible to match both roll-pitch and side accelerations in the variable-stability aircraft. But the Ames research team felt that the company agreed that it was the effect of the response that was

of interest here rather than the response itself.

Therefore, the controls were set to provide variable side acceleration on the pilot without regard to the amount of rolling, since it is that roll effect which is of most concern to a pilot.

At the conclusion of each Rollis test program, NASA makes oral informal recommendations to the various teams involved. It is up to the contractor to make out the necessary design improvements.

Refined in the prototype-assembly work at Ames are the flight parameters for maximum maneuverability. When variable stability control is achieved, developed at the North American F-100, for example, the variable stability attitude was used in working out the laws.

In the case of high-speed supersonic aircraft, behavior can be simulated in the F-86 and F-100 which is in the actual aircraft right off the bat—the ordnance is left out and the company agrees that it is the effect of the response that was



HELLCAT CONTROLS: Each stick rolling input velocity is fed into the aircraft and makes

During contractor programs, NASA provides ground radio contact and chase aircraft when necessary.

Tail Equipment

Although the strange arrangement of plumbing and control lines in the F-86 cockpit has been described as a "wet nightmare," the instructor test pilot can be checked out in the variable-stability aircraft in half a day.

The F-86 second aircraft put into use is the spruce offset, a wire mesh tail fin. It is, however, compared with the variable-stability aircraft the only problem.

The type of equipment used to vary the stability of the Ames aircraft is also for the both lateral and longitudinal changes.

In the case of the rudder control system, the pilot's return is compensated with the exception of a differential lagging at the connection between the rudder pedal and the rudder itself. This permits the pilot to activate the rudder at the same time that the servo in the system does. The total rudder system thus is the sum of the polystyrene and servo-applied systems. While the pilot retains control of the rudder, the directional stability is affected by the varying moments produced by the servo system.

A roll-pitch ratio feeds signals electrically to the servo-mechanism which moves the rudder to produce the effects desired.

The pilot controls the servo system by means of knobs in the cockpit which can be adjusted in flight.

Changes in apparent yaw damping are produced in much the same way by means of a rate gyro which senses the rolling or yawing velocity. A similar sensor drive system in the F-86 produces changes in roll damping.

"Pilot studies have been of particular interest," continues Kaufman, "in that they have associated with them airplane configurations and increased flight speeds and altitudes," says flight researcher Kaufman. "On the other hand, the high damping region is also of interest in connection with related applications of powerful new dampers."

Studies of such factors as roll-pitch coupling also are of great importance at a time when differences in this regimen are plagueing high-speed supersonic aircraft.

It should be noted that the variable stability responses have potential can reduce flight experience in such regions as the time they were not being characterized in experimental aircraft designs," says Kaufman. "That flight experience has been widely distributed among pilots from Ames and other laboratories, in the Air Force, the Navy and aircraft companies."



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LETTERS

'Light' on Tacan

This is in response with some alarm to "Light on Tacan" in the June 20 Aviation Week (p. 101).

Your editorial goes to the impression that we have pre-discovered that Letter, and that you now have, for the first time, real and sensible guidance for a program of Tacan that has to do with the more, and perhaps even the best.

First, it would hardly really and easily disbelieve that that Letter is factual, well-reasoned in its approach, and very sound to believe, or justifiably significant. It was part of the public record during the course of the Government hearings on the subject, and I am afraid that the author of that same need-of-care letter to study it—should show you the true significance of tacit in that Letter. Unfortunately, it's not this significance—he "imposed us" of light—in our particular field that you'll be having trouble with.

The House Interstate and Foreign Commerce Committee didn't do a buck for me on that Letter, and neither did the Senate Armed Services Committee. Subsequently, the House Committee on Government Operations on January 10, 1955, again discredited it, and took back at that time the decision.

Now editorial writers are here, many behind the "important" tag of light, without having concerned yourself with the research record. You can thus discount the contents by the author of that Letter to Congress. Department and the Civil Aeronautics Administration were anxious until shortly before the 1955 act was enacted that Tacan was being developed and would cause serious conflict with their own DME program. They could understand that the transponder system of the Tacan was not at all comparable. Everyone knows now that both the CAA and Congress were right that a highly accurate thing called Tacan was being developed.

But what a little palaver a reporter would have to go through to find out that Tacan was always highly classified! It was described to the civil agencies as being solely and exclusively a military system (which is where in my mind human heads, and hence could not even be discussed with civilians), and CAA that the CAA had been told that it could not right along with VOR/DME at all along land.

It would only have taken one person to call to determine that the military themselves were continuing a policy to the civilian and commercial world of VOR/DME that was identical to the S in the Common Systems radio-navigation act. You could have quickly determined that the military have for years been participating in ADC activities and that the ACC has been develop-

ing Angling Work performance the equivalent of its audience on the Internet rather than the imagination of the public, and was continuing to do so. Please, dear friends, write to the Public Affairs, Woods, 229 W. 42 St., New York 18, N. Y. Try to keep letters under 500 words, and give a genuine idea of what you know about the matter. Enclosed are letters, but names of sources will be withheld on request.

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ters to be seen that these provide sizable incentives to incentive firms to transform, or at least do not penalize those who choose to do so.

Transistor Prices Down

There appears little doubt that the transistor's present leadership of higher price as well as its temporary condition as a novel novelty have been born of recent price cuts by several leading producers. The industry is fast coming up with improved reliability and processing techniques to enable it to slash prices further. A GE spokesman estimates that transistors will be competitively priced with tubes in 1957... cheaper than tubes in 1960-63.

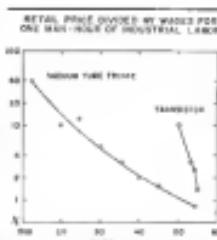
A recent analysis, made by Dr. William Shadley, a Bell Telephone Lab scientist and financial expert, indicates that the price has dropped much more rapidly than the rate of increase in the price of transistors. The rate of increase in 1948 has had the price of tubes since then cut 40 years ago.

In his analysis, Shadley studies not the effects of increased wage levels throughout the country in order to show precisely the effect of increased labor cost and manufacturing shift on tube and transistor parts. Shadley's compensation, shown in a curve sheet, entries, therefore plots total price divided by wages for one hundred of industrial labor. The curves, furnished by courtesy of Dr. Shadley, were first presented by him in an unpublished speech which covered the Committee Prize of the National Academy of Science last year.

In addition to the fact that tube users have fewer parts and thus require more man hours on those than do transistor users, Shadley points out another interesting difference which may eventually give transistors a price edge over tubes. A single transistor tube can be used over a far greater range of operating voltage by changing the bias levels than can a vacuum tube.

For these reasons, Shadley expects that transistor devices will be able to fulfill their circuit needs with far fewer transistor types than the number of vacuum tube types now required. This will mean higher production of the fewer transistor types, with resulting manufacturing economies. It will also have important logistic implications for the civilian services.

Although the industry still produces nearly 200 types in many serving type tubes as transistors that can (40 million) in an estimated 14 to 34 million transistors, the rate of growth of transistor production suggests that the semi-conductors are excellent tubes in the not-too-distant future, according to another set of curves prepared by Dr. Shadley (see right).



PRICE COMPARISON, plotted to eliminate the effects of changing wage scales, suggests that transistors soon will cost less than tubes.

Resilience of the transistor industry is manifested in an expanding market base. It is found in the rate of annual increases of expanding facilities and mechanization by such firms as GE, Motorola, Texas Instruments, Sylvania, Raytheon, Westinghouse and others.

Transistor Reliability Up

During a debate on the subject of how soon transistors might replace vacuum tubes at the recent Electronic Components Conference in Los Angeles, USAF's Maj. Gen. C. S. Ingraham, said:

- 4½¢/1,000 hours.
- 2½¢/1,000 hours.
- 1½¢/1,000 hours.
- 9½¢/1,000 hours.

No Longer "Around the Corner"

A year ago, Aviation Week cited the chief engineer of a major aircraft firm what his company was doing in the way of transistors. He replied: "Very little. We figure that transistors are still for your shop."

Today, this same firm is pushing transistors into hard. One major factor behind the switch was the problem availability, increased heat generation, of high temperature silicon transistors, which opened up their use at 125° C.

The heat that transistors generate will be some 100 times greater than the light of Aviation Week's survey.

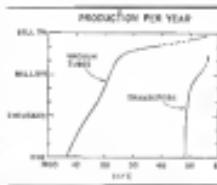
Avionics Bulletins

• Thermionic heat detector cells, to operate at temperatures up to 1,000° F., between 720-800° F. (10-20° C. per volt), have been developed by the Defense Department's Bureau of Naval Weapons. See: *ENR*, Oct. 28, 1958.

• Improved 36 in. \times 36 in. instrument stand 100 inches high (311-452 gm.) from the Defense Department's Bureau of Naval Weapons. See: *ENR*, March 12, 1959.

• Hermetically sealed resistors, a general purpose resistor, made over a temperature range of -196° to 100° C. (standard resistance 100 ohms) have been developed by IBM Research Division, Endicott, N.Y.

• Copper-beryllium available for as low as 10¢ per pound, has been developed by the Defense Department's Bureau of Naval Weapons. See: *ENR*, April 13, 1959.



PRODUCTION COMPARISON of tubes and transistors plotted on logarithmic scale, reveals transistor output is growing fast.

FLY WEATHER-WISE

These weather items prepared in consultation with the United States Weather Bureau.

HURRICANES



BE PREPARED for these increasing, revolving winds—hurricanes between June and November in the Northern Hemisphere.

The hurricane feeding typhoon in the Far East is a revolving storm, originating over exposed seas.

Devastating winds of 75 mph velocity or more extend outward from the center for a distance of 90 to 300 miles. Not usually hurricanes begin to affect the Gulf of Mexico in June, gradually shaking up the East Coast by September and October, as shown on map at left.



Hurricanes move fairly slowly (about 10 mph) before they reach the north and northeast, but usually accelerate to 20-25 mph after they are headed north and as they get to the

higher latitudes off the East Coast they may move as fast as 50 mph.

If it looks like your plane will be in the path of Hurricane winds, it's wise to have a guess up and ready to move. If you are unable to move it from the storm's path, lean to the Westerly Breeze's hurricane advisories and head it into the wind, steering all control surfaces. Tie it down in an apparently level attitude. Then use the digging holes for the main gear and elevating the tail, if necessary. Near shore the wind blows counter clockwise around these states, so direction depends on which winter quarter alerts you.



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第十一章

Low and high tension system around the ankles, etc., probably reflects past and earlier history of sprain and strain, shoulder girdle and knee biomechanics, postural, balance and alignment issues.

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available for use with the 14-day system. Bulletin P-173 (12 pp.)—Streis-Orbison Co., Inc., 1000 N.W. 12th St., Miami, Fla.

7. Ark State and Arkansas Game and Fish Commission—The state game agency maintains a 14-day system. Bulletin No. 10 (12 pp.)—Game and Fish Commission, Little Rock, Ark.

8. Indiana Game and Fish Commission—Indiana has a 14-day system. Circular 44 (4 pp.)—14-day System. Indianapolis, Ind. (1948). Indiana Game and Fish Com., 1414 W. Michigan St., Indianapolis, Ind.

9. Missouri Game and Fish Commission—Missouri has a 14-day system. Circular 10 (12 pp.)—14-day System. Jefferson City, Mo. (1948).

10. Pennsylvania Game Commission—Pennsylvania has a 14-day system. Circular 10 (12 pp.)—14-day System. Harrisburg, Pa. (1948).

11. Wisconsin Game and Fish Commission—Wisconsin has a 14-day system. Circular 10 (12 pp.)—14-day System. Madison, Wis. (1948).

one-half mile off U.S. 100 at Baxley Reservoir. Come to the bridge over the river and park. A paved road leads across the reservoir. Walk up to the right bank about 1000 ft. It goes past two large rock walls. The first one is about 100 ft. high. The second one is about 150 ft. high. At the top of the second wall is a small opening. This is the entrance to the cave.

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From the photos, the set appears to be somewhat larger than complete E. S. equipment. Many units

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AVTRON Aircraft Driven Valves Self-locking and self-sealing; aircraft-driven styles and sizes of 1/4", 1/2", and 3/4" diameters are available in aluminum, stainless steel, and brass sizes 3/8", 5/8", and 1". For use with all types of aircraft fluids including JP-4, plus other fluids such as alcohol, water, hydraulic fluid, refrigerant, glycol.

AVTRON One Way Restrictor Valves Available with either male or female ANG-type connections. Standard flow restrictors are available in sizes 1/4", 1/2", and 3/4" diameters for operating pressures up to 1,000 psi. Passivated for hydraulic fluid compatibility protection, and offered in stainless steel, aluminum, and brass.

Also: W-10000 Two-Way Restrictor Valve, A-10000-100
High Pressure Restrictor Valve, A-10000-100
Low Pressure Restrictor Valve
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NEW AVIONIC PRODUCTS

Components & Devices

* Substrates capacitors, Type 115P

can be operated at 115°C without voltage derating, according to ratings data sheet. The surface-pot capacitor, designed to meet environmental requirements of MIL-C-1608, has self-healing dielectric and glass-to-glass seal. Eng. success, Ballistic 234 gives application data. Sprague Electric Co., 323 Marshall St., North Adams, Mass.

* High temperature resistor called Polytherm

a metal film type which reportedly maintains its 15% tolerance under high boundary conditions and appears to derate up to 110°C. Temperature coefficient is quoted at 150 ppm deg C. Units come in S, I, and Z with wire Polytechnic Research & Development Co., Inc., 282 Tillary St., Brooklyn, N.Y.

• Long life chopper, Type 300, rated for 2,000 hours life, operates from 6.3-v d.c. and generates 400 cps. Modulation frequency is rated for operation between -50°C and 100°C, up to 50,000 ft altitude, and reportedly withstands 100G

mechanical shocks. Switching phase angle is 85° to 15 deg., dwell time on each pole is 14° ± 20%, and frequency limit of dwell time is 0.4 to 15 deg/sec. The SPD1 shaper (outputs are listed for 1 mA at 0.1, 10, 100 volts) Ayrton Products Co., Middle River, Baltimore 20, Md.

• Thrustless capacitor has new type of integral chassis mounting which enables unit to withstand high shock and vibration. Lead-washer and fire-retardant varnish.



expander to diodes

Unit operates over temperature range of -50°C to 170°C or up to 200°C on special orders. P. R. M. & Co., Inc., Indianapolis, Ind.

• All-metal vibration mount, which manufacturer reports weighs off 40 percent of MIL-C-772B, has resonant frequency below 10 cps, with a magnitude factor of less than 11 at resonant, and with no double transient peaks. F. R. Fung & Co., Inc., Electronics Div., Elmhurst, N.Y.

Test Equipment

• Type characteristic curve tracer, Type 570, gives a visual display on a cathode ray tube of operating characteristics of various tubes, including families of curves, under a variety of load operating conditions. Tektronix, Inc., P.O. Box 531, Portland 7, Ore.

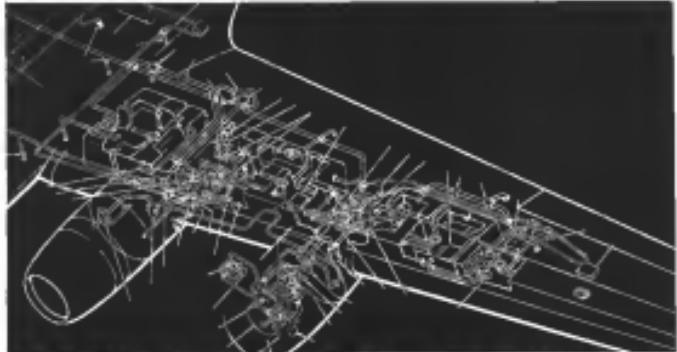
• Cad has rotatable, high-current, alternating, rectangular number of turns wound on non-magnetic frame with a reported accuracy of 0.1%. Cad is paired with test lead and form compensated with a wide range of resistances after the equipment. Unit is available in three models depending on magnet size.

• Testable characteristic curve tracer, type 5700, measures family of curves on irradiated boronized d.c. microphones, to provide comparing, matching and selecting of transistors or to spot faulty units. Accuracy is reportedly 3%. Magnetic Amplifiers, Inc., 612 Tatton Ave., New York 35, N.Y.

• Electronic digital counter, Model 521A, for measuring frequency, speed, rpm, random events, sensing of rates of 1 cps to 120 kc, provides direct logic-level processed reading. Unit sells for

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SWA 1000 Igniter, Hewlett-Packard Co., 219 Page Mill Road, Palo Alto, Calif.

Laboratory Equipment

• **Broadband Stress Model 110.** An ion-beam stabilizer with nearly gas-free band gap and 24 dB octave attenuation outside the pass band, periodic leak and low earth temperature to be cycle peakloads set from 20 cps to 200 kc. Calibration accuracy is 10% at 5% on special scales. Koford-Wilts Instrument Co., 580 Main Ave., Cambridge, Mass.

• **Precision test sensor, Type 110.** provides a high-gain, low-noise 10-mc receiver, a variable-gain broadband detector, and means for setting the 10° input of a wide variety of resonance devices. When combined with suitable local oscillator, the new atomic device can be used as a sensitive microwave detector. Andover Instruments Laboratory, Inc., 166 Old Country Road, Andover, N.Y.

Transducers

• **Most delicate mill, Type 1117.** employing thermocouple elements for maximum accuracy, fast detection, has sensitivity of 50 millivolts when shunted by a 3-baseband amplifier impedance, and a time constant of 12 microseconds, according to manufacturer. Spectral response is 1 to 12 microns with spectral red window, 1 to 25 microns with



AVIATION WEEK, August 3, 1953

other windows. Type 1140 cell for use where "soft" heat from an arc is present in high vacuum situations is a problem has a sensitivity of 150 millivolts and a time constant of 25 ms. Series Corporation of America, 2020 Jenkins Turnpike, New Hyde Park, N.Y.

SWA Uses Low-Cost Ignition Analyzer

A new aircraft ignition analyzer that costs about \$100 in itself and similar equipment is being used in Southwest Alloys' own DC-3s and Martin 2-0-4s.

These FINE AIRPLANES Make FINE SEAPLANES with EDO FLOATS



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Radar matched tube

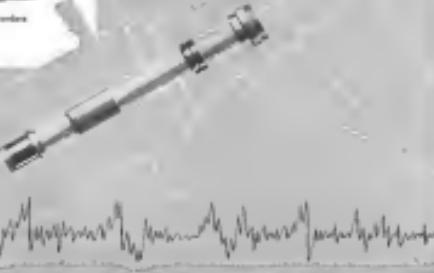


Tapered tube prior to wave forming with beamed surface profile



Cylindrically babbled waveguide tube

No other material
can do the job



National Seamless Tubes of USS Stainless Steel chosen for Radar Scanner Wave Guide Tube

The wave guide tube, along with the rotor control, form the central control unit of the Radar Antenna Systems designed and manufactured by Davis Electronics, Inc., of Detroit, Michigan.

Originally, the wave guide tube was manufactured from carbon steel initially plated to eliminate corrosion. Manufacturing complications and plating difficulties proved this process economically unsound and operationally hazardous. That's why NATIONAL Seamless Tubes of USS Stainless Steel were specified. The 14 $\frac{1}{2}$ " I.D., $\frac{1}{2}$ " wall stainless USS Stainless Steel tubes offered a clean job that required no plating and solved the corrosion problems. In addition, only stainless steel tubing could meet the weight and strength factors required.

The superior strength, consistent uniformity, and dimensional accuracy of National's Tube's Seamless Steel Tubing make it ideal for all types of vital applications. It is available in a wide range of diameters, wall thicknesses, various shapes and steel analyses, and is produced to exacting standards by the world's largest manufacturer of tubular steel products. Upon request, our engineers will be glad to make a study of your requirements, and help you apply Stainless Steel Tubing to your particular specifications.

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tubes and components 1-274-46, 2144-742
Galvin Radio Inc., Cedar Rapids, Iowa
Pneumatic tools and components 211-468
Hawker Aircraft Corp., 2120 Detroit St.
Detroit, Calif. 90021, telephone 212-3666
Hawker Aircraft Corp., 1910 W. 6th St., Los Angeles 16, Calif.

USAF Contracts

Following is a list of recent contracts announced by the United States Air Force:

Electro Dynamic Engineering Co., 10 Third Ave., Jersey City, N.J. (two years), USAF used in measurement and testing aircraft systems
Value \$10,000,000. Contract No. AF33(65)33-64-0001.

Northrop Corporation, 6000 Glendale Avenue, Glendale, Calif. (one year), AF33(65)33-64-0002.

Honeywell Inc., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0003.

Watson Electronics Co., Box 44, Cicero, Ill. (one year), AF33(65)33-64-0004.

Lockheed Aircraft Corp., Burbank, Calif. (one year), AF33(65)33-64-0005.

Air Materiel Co. Inc., 100 W. 42nd St., New York, N.Y. (one year), AF33(65)33-64-0006.

General Dynamics Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0007.

Varian Associates Inc., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0008.

Raytheon Company, 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0009.

Electro Dynamic Engineering Co., 10 Third Ave., Jersey City, N.J. (one year), AF33(65)33-64-0010.

Yerkes College Graduate University, New York, N.Y. (one year), AF33(65)33-64-0011.

Research Institute Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0012.

University of Illinois, Board of Trustees, Urbana, Ill. (one year), AF33(65)33-64-0013.

University of Clark, 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0014.

Amherst Corp., Pittsford, N.Y. (one year), AF33(65)33-64-0015.

General Electric Co., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0016.

Stratos Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0017.

Westinghouse Electric Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0018.

Equidiameter Corp., 1000 30th St., Long Island City, N.Y. (one year), AF33(65)33-64-0019.

St. Paul, Minn. (machined parts)
National Precision Products, 2119 N. Franklin Street, Chicago, Ill. (machined and machinable parts)
Contract No. AF33(65)33-64-0020.

Motor Adams Corp., 2120 Detroit St., Detroit, Calif. (one year), AF33(65)33-64-0021.

St. Paul, Minn. (machined parts)
National Precision Products, 2119 N. Franklin Street, Chicago, Ill. (machined and machinable parts)
Contract No. AF33(65)33-64-0022.

Thompson Products Inc., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0023.

American Machine Corp., 10-18 144th Street, Bronx, N.Y. (one year), AF33(65)33-64-0024.

Scripto-Panzer Corp., 6000 South Broadway, Bronx, N.Y. (one year), AF33(65)33-64-0025.

Wards Products Inc., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0026.

Porter Pipe Co., 10 1/2 Union St., Worcester, Mass. (one year), AF33(65)33-64-0027.

General Power Corp., 1000 30th St., P.O. Box 1424, Elkhorn, Wis. (one year), AF33(65)33-64-0028.

Travis Mfg. Co. Inc., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0029.

Ward's Industrial Equipment Co., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0030.

Watson Electronics Co., Box 44, Cicero, Ill. (one year), AF33(65)33-64-0031.

Lockheed Aircraft Corp., Burbank, Calif. (one year), AF33(65)33-64-0032.

Air Materiel Co. Inc., 100 W. 42nd St., New York, N.Y. (one year), AF33(65)33-64-0033.

General Dynamics Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0034.

Varian Associates Inc., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0035.

Electro Dynamic Engineering Co., 10 Third Ave., Jersey City, N.J. (one year), AF33(65)33-64-0036.

Yerkes College Graduate University, New York, N.Y. (one year), AF33(65)33-64-0037.

Research Institute Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0038.

Stratos Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0039.

Westinghouse Electric Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0040.

Equidiameter Corp., 1000 30th St., Long Island City, N.Y. (one year), AF33(65)33-64-0041.

Alfred Pfeiffer and Company, 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0042.

Westinghouse Electric Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0043.

Equidiameter Corp., 1000 30th St., Long Island City, N.Y. (one year), AF33(65)33-64-0044.

Stratos Corp., 1000 30th Street, New Haven, Conn. (one year), AF33(65)33-64-0045.

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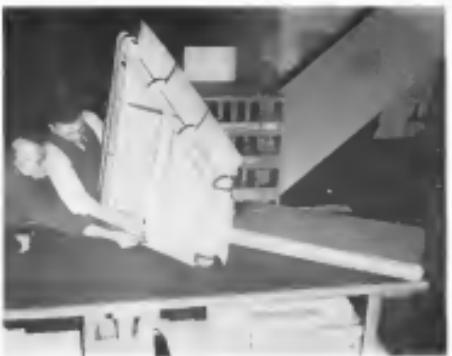
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Aviation Week Picture Brief



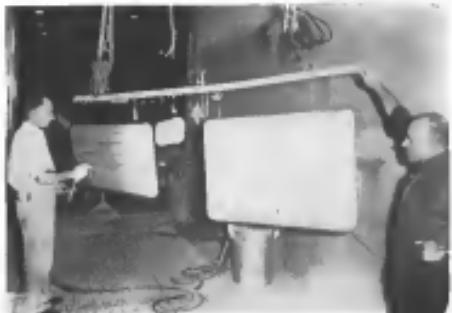
Balsa Forms Mold for Short Run

Panel size of balsa and paper to construct a mold for an inflatable latex bag was developed by engineers at Glenn L. Martin Co. for pressure testing parts of the new XPM-1 SeaMaster.

It was a permanent job, not temporary, as balsa would not do. Instead, balsa wood was used for a frame that was then covered with polyethylene-coated paper. Latex latex was sprayed over the paper to form the one-piece sandwich bag.

With the bag formed, balsa was cut a small slot so they could reach inside the bag, catch the balsa form and extract it at wish of paper and balsa. The tubes were inserted and the slot sealed.

Since latex was sprayed to bring the thickness to the specified value, there the bag was constructed.



AVIATION WEEK August 1, 1955

BUSINESS FLYING



MARION AND C-MARIN flying members of their married fleet of transports used for equipment evaluation.

Meteor Offers Flight Test 'Package'

By ERIC J. BRILTON

Aero Storage of flight test facilities that are delaying equipment manufacture development to production cycles are being interested in a new business sector division of Meteor Air Transport, Teterboro, N.J.

The idea is to set up a growing series of chart rooms in aeronautical research facilities, says the division has been set up as its current program.

In addition to setting up individual manufacturing, Meteor's own USAF's own test problems in offering another facet for participation by EFTD. He is trying to get the division management in a USAF approved civilian flight test agency so that he could bid on parts of the service's backlog. This might be extended to cover Air Research & Development Commission studies. He says that the Government Research Directorate, Cambridge, Mass., has shown considerable interest in using the service, particularly for weapons research projects.

The former comprise a vast program generation of small firms. As weight of numbers and public output, they have exceeded the limited supply of military flight test facilities already heavily engaged on expanding service interests.

"One of our first clients was told by Wright-Patterson AFB that he would have to wait a minimum of six weeks before the Air Force might schedule

laboratory in one Meteor's facilities.

Marion Flight Test operates a diverse pattern of services built around the firm's Meteor non-scheduled fleet and now being supplemented with non-scheduled aircraft purchased especially for use as testbeds.

Under this system, some of Meteor's transports load a double life testing equipment by day, long range by night. Occasionally there is cargo and freight transportation.

A manufacturer need wait no longer for such a few hours a day. If the equipment requires modification, such as a valve malfunctions, he sends EFTD the necessary drawings. The division selects a suitable aircraft and crew. Meteor drops in personnel to work overing the skin and power supply to drive the equipment and attendant steering devices.

The airplane is ferried to the customer where the equipment can be installed for the flight program. At the end of the day's flight, the equipment can be removed and the airplane returns to Teterboro. It may be set up for a cargo run that night. This sort of a contract helps Meteor get high volume out of its transports. It hopes this will allow lower cargo rates.

Test Costs

Under this arrangement, the manufacturer pays about \$250/hr for the equipment in one week. Marion adds \$100 per hour for each additional hour of the day's flight, plus \$100 per hour for each night's flight. For a C-46, the cost is about \$200/hr for the addition to these charges, a B-52 appears to match the same. A Navajo costs some \$35 per hour.

If the manufacturer wants to, he can have the response and care based at his facility for the course of the test program. EFTD's package for this includes all maintenance, fuel and oil, crew salaries and other living expenses, insurance, landing fees and necessary certificates and licenses. Costs for such a contract work out approximately to follow:

- C-46—\$10,000 per month, averaging 50 flying hours. Over this time it runs \$175 a flight hour.

- DC-3—\$70,000 per month for 30 flying hours, \$175 per hr after 18 hrs.

- B-25—Same as the DC-3.
- Navajo Super 260—\$10,000 per month, and \$175 per hr after 18 hr.

Another service is called a dated rate contract. Under this a monthly base can have Meteor fly equipment in its regular cargo rate of \$50 per hr plus fuel surcharge and equipment manager. A typical example is heavier aircraft radio equipment. The results come because a company act to the C-46's normal radio part. The Meteor operator keeps a running log

AVIATION WEEK August 1, 1955

on the component's performance in spite of it transmitting over 90 percent twice, once with his standard equipment, once with the test set, thus placing in the tower that it is a test. Operating personnel who wrote up the informal pressurized evaluation of each piece of equipment.

Modifications in 12 Hrs.

Kosmader modified a piece where a tube equipment holder needed to run this side-type test prior to shipping. The equipment failed during the Motorco flight and an inspection showed a deep fatigue that was cor-

roded before shelves were loaded with the new product.

According to Kosmader, the flight test distance can have an airplane each foot and each for flight within 12 hr., including CAA approval. He notes that there have been no problems regarding military search engines for Meteor requirements. Generally speaking, the test houses have no need to know the details of the equipment they are installing or testing. They merely get an engine ready to take a "package" and then fit it according to specification. The test houses' personnel use the only time concerned with running the component and its performance.

It is obvious that Equipment Flight Test is getting set for a long busy trial. The Division spent approximately \$15,000 in recent months for additional shop and testbed servicing equipment. Another \$50,000 is anticipated for the third equipment purchase.

The company is trying to do its best to keep 4TID costs down. It selected the Meteor's C-46, but the demand for these airplanes, because of their low-turbine blower engines that permit operations at 23,000 ft., will soon outgrow their availability. Meteor President Robert Morris and chief flight test engineer John Schmitz have been overseas shopping for two more C-46s. With a fleet of eight Commandos greater flexibility in planning flight test and engine open hours will be possible.

On Dec. 25, aircraft acquisition is scheduled to be initiated to put into shape the test center. Kosmader indicated he may need two B-25s. The company has leased a bimotor for one test engine, but uses a deplane used for one of these vehicles and plans to buy a B-25.

Morris probably will get a license for overwater transportation, having his Nissen Sept. 26 and giving ITED two of these light planes to testing business aircraft under equipment flight test contracts and aircraft repair.

Brennan pointed out that Kosmader has a contract for a twin jet made in the Boston U.S. shows that out of 100 equipment manufacturers he tested 15% and they had an immediate requirement for the private test facility's services. Some clients have signed up with ITED and others are negotiating contracts. Another 20% told him they would need such services within the coming year and they would contact him when that requirement was made. One problem is that he can't guarantee an aircraft as flight test all production equipment he had.

He expects that in the next 10 days the company will get three big contracts in the New England area and will request setting up office and maintenance and crew facilities there.

Executive Ventura Cruises at 300 Mph.

A modernized Lockheed Ventura that flies at over 300 mph for 2,300 mi without external cruise power carrying 14 passengers has been developed by Howard Aero Service, Inc., San Antonio, Tex.

The "Super Ventura" is powered by two PWPA 8200M2s and carries 1,300 gal of fuel.

Ventura's original fuselage has been extended, suspending the tail fin, the modification firm reports. A sprung tail boom system is fitted to the

"Super Ventura's" controls to reduce load for high pressure.

A rigid airbus has been built into the fuselage nose to lessen transmission of vibration from the propeller axis.

Initial "Super Ventura" has completed its flight test program and passed engine evaluations as being built.

PRIVATE LINES

Production of Canadair 488 twin engine Navion has reached test models at the company's new plant at桂林 (Gatineau) near Ottawa. Test Navion conversion is expected to reach test models in the near future.

Three Bell 47G-2s are being delivered to Canadian Instrument Co., Cochrane Springs, for developing key target zones. The aircraft flying characteristics of a 380-lb. 12-in. diameter being led by the firm. First copy has been delivered, second is due this month and the third next March. The will have night flying equipment. Pipeline Construction & Drilling Co., Camp Hill, Pa., is getting a second Bell copy this month.

Executive Liner has flown nonstop 2,175 mi from Gander, Newfoundland to Paris in 8 hr. 36 min. Plane, owned by international referee Charles B. Wrightson, features the initial transoceanic aircraft modifications of a British Polar Path concept, especially designed for separate navigation at high latitudes. It can also serve in the dry-heat control element of an autopilot system.

Two de Havilland-Canada Bisons have been purchased by U.S. Defense Department, Test and Engineering and Nationalization Service, to support fighter pilots. Plans were sold by Felt Co., Inc., Newark, N.J.

Large business aircraft service center is scheduled to open this month at David Airport, Marana, Arizona. Tucson Business Aviation Center will be open 24 hr. a day for complete maintenance, including major engine and components.

Executive aircraft leasing service, offering single or twin-engine equipment package complete with crew, has been established by Executive Flights, Inc., Love Field, Dallas, Tex. Expansion of the company is planned. Present equipment: Two Lockheed, one Beech Twin Bonanza, two Beech Bonanza and a Nissen Bod. Of Co. Inc. recently assigned its aircraft to the firm to operate.

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NEW AVIATION PRODUCTS



Low-Noise Aircraft Inverter

Model SH-241 aircraft inverter, made by the Kline TM-61 Model, weighs 41 lb and is rated at 2.275 kw at 35,000 ft. Unit has electronically controlled carbon pads which regulate power loss due to eddy and center fields; thus voltage and frequency modulation are a fraction of allowable specification values, resulting in a reduction in "wind" level of noise system, the maker reports.

The inverter is self-ventilated and will operate at 90° in 10,000 ft. Angle planes that can influence static. It measures 15½ x 9½ x 7½ in.

Leland Electric Co., 1800 Webster St., Dayton 1, Ohio.

New Frictionless Machines

These new machines, of interest to the aircraft industry, will be among the highlights at the Machine Tool Show at Chicago's International Amphitheater Sept. 8-17.

Details

* Type K universal cylindrical grinder 12x36 in. has 5,250 rpm max. traverse speed, with constant speed possible in either direction. Grinding representatives are not by involving the universal a head which slides on a ground rod and fast to provide remote response to the feed mechanism. A unique feature is the ability to turn or index in standard equipment. * No. 125 universal grinder has an electro-magnetic work holder and universal

making the grinding cycle completely automatic from start to finish. It can grind three diameters on an abrasive shaft at a rate of 250 pieces/hr with round work ground to tolerances within 0.0005 in.

* Type K radial and 10x36-in. plan cylindrical grinder features high traverse extension from a one-piece box section bed casting with thick walls. Spindle speeds are from 54-200 rpm. * Automatic feeding, grinding and unloading will also be shown in action on a Lunde 16x40 in. 111 kW multiple wheel horizontal grinder.

Lunde Tool Co., Waukesha, Pa.

Frett & Whitney

* Flex optional wire table, 24 in., incorporates an early and proportion optical gauge using a graduated glass master disk to obtain basic fine minute settings. Optical methods also subdivide each of these units into 300 equal parts for direct settings to use instead of arc. Readings are magnified and projected on a view. Table has 50 deg. adjustment of the optical axis. * Separate readjustment gauge unit allows simultaneous angular to 30 degree deflections and can be adopted



Stainless Quick-Release Glove

Quick-release clamp designed for aircraft high temperature applications has stainless steel mechanism making it possible to tighten the item on the main neck that it attaches, using seven to eight turns, the master plates not being bent and collapsed with such extreme pressure and resulting damage.

The release mechanism is also available on V-brace chocks and a series of quick adjustment items, the manufacturer reports.

Specialty Products Corp., 29985 Lakeside Blvd., Wickliffe (Cleveland), Ohio.

ALSO ON THE MARKET

Dowfield fabric H-3 heat elastic Fiberglas reinforcing material for use at control surface locations including aircraft parts, oriented to retain strength and uniform thickness at stretch temperatures—Dowfield, Inc., Dept. H-31, Newark, N. J.

Skyhook-type lock lift track with remote control has 5,000-lb capacity and is 15 in. wide by arrow-wide rock. Available with 60 in. tall vertical type supports and 81 in. low metal lift supports—Fleewheel Power Electric Co., Cleveland 3, Ohio.

Liquid epoxy hardeners RP-T and RP-12 are recommended by DuPont for applications where high heat properties are wanted, such as laminates, resin-filled molding, encapsulation bonding and the like—Chemical Process Co., 900 Spring St., Redwood City, Calif.

Seven-power measuring transducer for industrial use has built-in checking mode, built-in self-test and self-diagnostic. Magnetics have a transducer, remote control, remote input—Burch & Lewis Optical Co., 635 St. Paul St., Rochester 1, N. Y.

Kelon P molded rod in 1 in. dia. goes from 3 to 5 in., and takes wall thickness



STRATOS

AIR-CONDITIONS THE NEWEST USAF BOMBER THE EIGHT-JET BOEING B-52

The Boeing B-52 jet bomber entering operational service with the Strategic Air Command this spring becomes the world's first heavy jet bomber to go into service.

Joining its medium jet bombers tomorrow in SAC—the Boeing B-47—the B-52 "Stratofortress" greatly strengthens America's Air Arm. A high flying, high speed heavyweight with a range longer than that of any other operational jet aircraft, it is destined to be the backbone of SAC's striking force for years to come.

To cool the crew and the line of intricate equipment aboard the B-52, Boeing picked a highly efficient cooling system designed and produced by Stratos.



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In impact, count and sort a wide variety of components, the manufacturer states. * Parcels rotary table, 42 in., automatically positions work to an desired angle permitting automatic programming dual vertical centerline production and to two seconds of arc. After initial settings, the operator has only to press the cycle start push button and the table automatically reduces counter-clockwise from one point to the next. * Anti-DM 1000 electronic control panel provides for all types of checklist and adaptive feedback, even though total exhaust capture light is used for out-of-tolerance warning in addition to four standard package gate units with calibrated air reduction for direct flow meter readings.

Frett & Whitney Division, Niles-Bement-Pool Co., W. Hartland 1, Conn.

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axis from 1 in., are available in positive quantities for applications where continuous chemicals at -30°F to 400 continuous temperatures are encountered—Sales Dept., Sherman Engineering Co., 11617 W. Jefferson Blvd., Culver City, Calif.

Can feed, drilling and tapping tools provide increased savings, eliminate inventories and an engineer can never be operating expensive controls, either as valves or motor switches. Positive safety clutch provides load drive. Speed and load changes are handled by "pick off" gears—Kingsbury Machine Tool Corp., Kenosha, N. H.

Central-pump base dampers used in place of ordinary jacks prevent the damage to use with high-pressure bases. Available in 10 sizes from 1 in. up to 23 in. Tel-Circle Corp., 19 Broadway, New York 6, N. Y.

Thread size 1/8-16 is now available on Klock lock practice self-locking anchor nuts applicable in temperature ranges



to 350°F.—Klock Co., Klock Div., 628 E. 16th St., Los Angeles, Calif.

Laminated bonding material at the Port Authority Office in Newark is bonded mechanically, rather than thermally or chemically. It possesses laminates of uniform thickness, high resiliency, and equal strength in all directions. Tensile strength is high—E. I. du Pont de Nemours & Co., Wilmington, Del.

Precision bearing life test Series EE Model 1000 has an oil electric speed control for infinitely variable engine speeds and load or constant surface cutting speed. Electronic control system provides power for the unit's 20 hp d-c variable speed motor drive motor, with sufficient capacity to operate the motor at 30 hp without excessive overloading—Monroe Machine Tool Co., 3rd Ave., Ohio.

Adjustable press control arms have taking drift, permitting height adjustment so that machine operator can locate and stop battering due to his movements. Arms swing on a central ball joint connection—Dally Machine Speedster, Inc., 4918 W. Broadmoor Rd., Chicago 18, Ill.

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• SAFETY

Lordegas to park up some passengers and then proceeded to Foothills. His actions resulted in his being charged with a violation of the Civil Aviation Act of 1940. The flight, later to Lexington and the weather lowered en route, would be legal for flight at 1000 feet.

The station received a call from the northeast at 0710 p.m. from a pilot flying from the west coast to the east coast. Both CAA and the station were advised that the flight was 3,000 feet and was requested to furnish a pilot report on landing after transiting. The pilot replied that he did not believe he would get that high but would call if he did. Immediately upon arrival at the station, the master attitude, and turn, was determined and the flight acknowledged the message.

This was the last radio contact. While CAA Wrecksburg was in the station, the station had observed that the aircraft was losing altitude and was on the map by the radio controller, Edward C. Agee.

No radio calls were heard along the route east contacted by the pilot of N9999E and no flight plan was filed before departure or en route.

The presence of the aircraft was confirmed by both the CAA and the Concourse air traffic controllers to CAA Air Route Traffic Control and the Concourse tower.

INVESTIGATION

Immediately after the accident, when notified by the tower, the U.S. Weather Bureau office at the import administration building made an observation. The report indicated at 0650 p.m. three minutes after the accident, conditions were reported in Gettysburg measured 1000 feet visibility, overcast, visibility 4 miles, light freezing drizzle, log temperature 35, dewpoint 25, wind south west 11 knots, altimeter setting 29.99 and barometric reading 26.03 feet ventile to 5000 feet.

The accident occurred within the boundaries of the Greater Concourse Airport control zone, which is 10 miles in diameter from the center of the tower.

The next point to the left of the Martin wreckage was 21 miles west of the airport control tower and approximately the same distance from the northeast end of the runways to the left of the Martin and to the right of the DC-3. The aircraft was located relative to one another in that the left wing of the Martin was higher than the right wing of the DC-3, and the right wing was lower than the left. The right wing of the Martin and the left wing of the DC-3 were in position to collide. In addition, the collision damage indicates that the Martin was climbing relative to the DC-3.

The investigation committee to inquire in conduct near the left wing of the DC-3 and the right propeller of the Martin. The right wing of the Martin and the left wing of the other aircraft then struck, causing the disengagement of the DC-3's wing on the Martin's wing, and caused extensive damage to the Martin's right wing that it separated from the aircraft before ground impact.

While the two wings were flying through one another, the left propeller of the DC-3 struck the right wing of the Martin top of the DC-3 fuselage and through the vertical fin and rudder while the Martin moved away and to the rear of the other aircraft. Near the end of the contact period, the forward side of the Martin's left nacelle suffered severe crushing damage on the

bottom or bottom edge in the collision. Posture of the DC-3 left wing after impact was consistent with the Martin wreckage.

The DC-3 struck as open, the field about one mile south of the Martin, approximately 20 miles west-southwest of the accident area. The wreckage was spread over 250 feet, but was concentrated at the point of impact.

A residue of twisted and torn sections of the left wing outboard of the bay and portions of the vertical tail were recovered between the two main wreckage sites. Following the examination of the wreckage, simplified drawings were prepared which reflected the location of the left wing panel and portions of the vertical tail were lost at the time of collision. The initial impact was greatest in a steep dive, on the nose of the left wing, and the tail was also damaged. The engine was undamaged. No portion of the Martin structure was found at the main DC-3 wreckage site.

Four propeller cuts were found across the top of the fuselage, one to the vertical stabilizer and one to the horizontal stabilizer, and one to the rudder, and the rudder was detached at the hinge. The leading edge was reattached. The top mechanism was destroyed and therefore the position of the flap at impact could not be ascertained. Examination of the propeller hub disclosed that the pitch on the left propeller at ground impact was 41 degrees, and the right 39 degrees.

All radio equipment was severely damaged and it was impossible to ascertain with any certainty what, if any, equipment was in operation to which frequency it might have been tuned.

About halfway between the two main wreckage sites vision passes of the DC-3 left wing structure, left aileron, and the base of the vertical stabilizer, damaged the right side of the Martin's right wing leading edge and wing sheet.

Study of the wreckage of both aircraft disclosed that immediately prior to impact the aircraft approached each other in an angle of about 10 degrees. The Martin was flying to the right of the two aircraft, coming to the left of the Martin and to the right of the DC-3. The aircraft was located relative to one another in that the left wing of the Martin was higher than the right wing of the DC-3, and the right wing was lower than the left. The right wing of the Martin and the left wing of the DC-3 were in position to collide. In addition, the collision damage indicates that the Martin was climbing relative to the DC-3.

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• SAFETY

DC-3 went tail. This caused portions of the DC-3 to fall miles to repeat its flight.

Several witnesses found who say he knew the two aircraft after collision. One witness said he heard the Muroc take off. About two or three minutes later he heard a sharp sound to the northeast which sounded a good deal of thunder or blasting. Immediately following his attention toward the source of the unusual sound, he saw nothing except the low aircraft for a few seconds. He said the aircraft had been in flight as long as 12 seconds before he saw an aircraft drop out of the clouds and burst into a ball of flame when it struck the ground. He recalled that he could still hear the sounds for a few more seconds after the aircraft flew down. He later learned that the aircraft he saw was the Martin, it exploded about one mile away, between his position and the airport. At no time did this witness see the DC-3 and he had no measure of acceleration of hearing head it going down.

Another witness found an explosion which started the window of his house. Quickly crossing the room, he looked out the west window and saw an aircraft bound north for an instant. He then saw the aircraft to his left, about six inches to the right, burst out of control, dive to the ground at a 45-degree angle and explode upon impact. He said it was the same considerably and instead that it was the T-33 aircraft which he had observed.

A third witness, "Red nose," looking up, he saw two aircraft to the northwest, and noted the heat of the explosion. The DC-3 was in a steep dive and the Martin was apparently trying to pull out of a dive. He got only a glint of light. "Red nose" believed both aircraft were lost. Although the aircraft were lost over the end of runway 22, he did not recall hearing the Martin take off.

Another witness, a municipal grade teacher in a nearby school, said a half hour after the site of the accident he heard a report that the lead aircraft was in an inverted flying condition shortly before the time of the collision.

One of the teacher's students, a boy of 14, was walking along the highway and looked out the window (Witness No. 5 on map). He saw part of the end of the building, going west, and turned back to his school work. He did not note the aircraft until he heard the explosion. He said the aircraft appeared to be flying close to the base of the clouds. His attention was again drawn to the aircraft a few moments later he said when he heard a sort of jagged, broken up, and almost at the most intense roar he had ever heard. He reported to a combination of sounds. He said that he saw two tails and the wreckage "came down in one heap." This was a field of fire and smoke when it hit the ground. He said that he told other students around him what he had seen and heard.

A sixth witness, who lived near the intersection, was walking down the driveway at his home when he heard an aircraft take off from the report. He then heard

an aircraft coming from the north and it passed, going west, west of where he was standing. It seemed to have lost the sound that this second aircraft was very low.

He assumed the sky had now two others of the two aircraft previously listed in the "bare condition." There were no other sounds between his position and the area where the two aircraft collided. While watching the sky, he heard a third and no explosive sound. By this time he had seen both one of the aircraft. After becoming a second explosion and exploding smoke as an aircraft struck the ground, this witness went immediately to the scene, which was that of the Martin crash.

A seventh witness was standing outside a gas station on Cahuenga when at about 10:55 his attention was drawn to see an aircraft flying much lower than usual, which he definitely identified as a DC-3. It had turned past his position, flying in a north-south direction, disappeared, and it reappeared in the distance toward the south. At this time he was telling all the time. The aircraft appeared to be perch or roll, but he was unable to state whether the right or left wing was telling at the time. The aircraft reappeared to be perch or roll, but he was unable to state whether the right or left wing was telling at the time. He observed no fire or smoke. The Convair DC-3 was painted gray with some blue.

Investigation disclosed that neither the Community ENAC station nor the Greater Los Angeles airport tower had any radio contact with the Convair DC-3 or with any other DC-3.

The accident occurred within the control zone encompassing the Greater Los Angeles Airport.

A control zone is an area of defined dimensions, extending upward from the surface, to include one or more airports. Civil Air Regulation specify that aircraft shall not be flown within the control zone below the ceiling, which is 1,000 feet, unless authorized by air traffic control.

In operating on an IFR clearance, a pilot would already be aware the possibility of air traffic control having within a control zone a VFR flight plan or a flight plan, a clearance to operate within the control zone, which would be required if weather conditions were IFR ceiling less than 1,000 feet or visibility less than 3 miles. If the ceiling is less than 1,000 feet, the aircraft would be required to fly under the group, remaining underneath and clear of clouds. In this instance, the ceiling was less than 1,000 feet and an request was received from the DC-3 for a clearance to operate within the control zone.

With the exception of the Convair DC-3, Capt. Workhouse received similar reports from South Field, Glendale, Fort Wixson, Dayton, Cincinnati, Louisville, and Lexington. He also received several forecasts, pilot reports, and a special service from the Fort Worth office which showed the ceiling increasing from 4,000 to 1,000 feet with light freezing drizzle. Weather reports for stations along the coast disclosed ceilings lowering from 3,000 feet at the Buell Creek area to 1,500 feet at Lexington, and that visibility would gradually lessen from eight miles at peak of the

low. (See Civil Air Handbook, Part 101, 10-22, 10-45; PTE, Ed. 1934)

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Flight test bottlenecks?



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Recorder... less than 0.1% peak-to-peaks (0.005 peak-over-500 cpm band) in 10 microvolts. Mechanical filter compensation has no playback effect; the figure is 0.1% peak-to-peaks (0.04% max) in 0 to 30 cpm range; electronic system compensation for flutter at higher frequencies.
Power... 115 volts, single-phase, 30/60/400 cps, 275 watts.
Size... 7 ½ x 22 x 11 ½", 60 pounds.

Recorders feature... oil-on-tap plate. Warning lamps indicate data loss from mechanical or electronic failure.

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RECORD AMPLIFIER*

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Signal Input... 0-50 microvolts full scale, channel input impedance to transmitter 100,000 ohms.

Power... 115 volts, single-phase, 58/60/400 cps, 323 watts.
Size... 10 ½ x 22 x 11 ½", 35 pounds.

*Also contains own data-channel amplifiers, power supply, bias and filter-control oscillators, and interchannel amplifiers.



SIGNAL MODULATOR

SIGNAL MODULATOR

Handles up to 12 pulse-in modulations per case for single- and "ringing" signal input voltages to a form suitable for precision magnetic-tape recording. Each channel accommodates either (1) direct-modulating input and (2) combination compound-modulation frequency-modulation (CMFM) modulator or (3) pulse-duration modulator (PDM). Separate power supply provides all voltages for 12 modulations plus CM carrier for CM recording.

Power... 115 volts, single-phase, 50/60/400 cps, 250 watts.

Size... (a) 12-channel modulator case, 79 ½ x 22 x 11 ½", 50 pounds.
(b) power supply, 45 ½ x 22 x 11 ½", 50 pounds.



AUTOMATIC CALIBRATOR



RANGE-TIME GENERATOR



PLAYBACK EQUIPMENT

AUTOMATIC CALIBRATOR

Provides "in-flight" calibration for both bridge-type and self-preserving transducers used for thermocouple signals supplied to 12 data channels simultaneously. Two units used for 24-channel systems. Zero check plus two positive and two negative calibration voltages provided for bridges and thermocouples. Zero check and two amplitude levels for vibration perhaps. Calibration of 12 channels completed in one second under automatic cycling control. Manual control provides calibration at choice periods.

Power... 115 volts, single-phase, 50/60/400 cps, 75 watts.
Size... 49 ½ x 22 x 11 ½", 45 pounds.

RANGE-TIME GENERATOR

Provides visual display of ranging-time control time at the recording equipment and at the remote control station. Also provides heavy-duty-coded-distance signal for recording on the magnetic tape and for use in a timer time signal control or separate counter, voltmeter, etc. Slightly over 27 hours... 99,999 seconds... can be accumulated and indicated.

Power... 115 volts, single-phase, 50/60/400 cps, 100 watts.
Size... 49 ½ x 22 x 11 ½", 50 pounds.

PLAYBACK EQUIPMENT

Standard each-mounted playback equipment can be operated in the laboratory or trailer-mounted for field use. One cabinet houses tape transport assembly and synchronizing preamplifiers. Second cabinet houses playback equipment and controls for compensated playback. A second cabinet houses demodulation electronics for recovering original signals. Interchangeable demodulators, matched to the modulation techniques used in recording, may be inserted into each channel converter. Reading signals can drive galvanometers, oscilloscopes, chart recorders, or magnetic digital-conversion devices, such as the CEC MILS/ADIC. Power... 3480 watts for typical 24 data-channel system.

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• SAFETY

picture to two miles to the Leavenworth area. Previously available before departure showed the existence of an overcast and the other route, with ceiling ranging from 3,000-4,000 feet in southern Michigan to 12,000-13,000 feet in northern Michigan, precipitation, Downburst and icing on the clouds. The overcast was composed of stratus cumulus clouds. The top of which was between 8,000 and 12,000 feet in Michigan and 14,000-15,000 feet in Kentucky.

When the Fokker departed there was a warm front slightly west of Battle Creek and a cold front several hundred miles to the west. The outer edge of the warm sector between the fronts. Winds were consistently at 15 knots or less at the outer edge and 120 knots near the cold front at 20-30 knots. Below freezing temperatures existed over the route from the surface upward and icing existed in precipitation areas and in the clouds.

The icing progressively increased as the DC-3 passed through, becoming more intense as it entered the precipitation areas with visibility occasionally dropping to 200 yards in light snow showers. By the time the flight arrived in the Indianapolis Indiana area, icing was about 800 feet with very light freezing drizzle and possibly occasional light snow.

The weather forecast by Dayton Radio in its regular 30-45 broadcast, indicated Greater Cincinnati Airport weather as being icing saturated, 3,000 feet near east, visibility four miles.

In Cincinnati's 30-45 broadcast, a special observation was made that 0643 was the earliest and last of the beginning and end of the weather report. The 0643 speed was Measured about 9800 feet, normally, very light frost coat, very light freezing drizzle, fog, snow northeast, 10 miles,揣揣, visibility 10 miles, temperature 30 degrees, dew point 20 degrees. Wind was later listed by Dayton at 0643.

Fog in the area of the airport at the time of the accident was light but extended from the ground to the base of the clouds.

Cutting at Cincinnati was measured by a running refractometer. Its record reflected the following: 0643, 1000 feet; 0642, 900 feet; 0641 and 0640, 700 feet; 0639, 900 feet at 0638; 700 feet at 0637, 0636, and 0634.

The wind at the base of the cloud (700-900 feet above the ground) was from about 100 degrees, blowing across the clouds east. At the site of the EDC-7 wreckage at the base of the accident was moving sand southwest approximately over the center of the measured line [0630].

There were five contributions to duty in the control of the aircraft at the time of the accident. The lead controller who issued the takeoff clearance when the Marine took off from the lower deck of his position that takeoff occurred at 0642. The approach controller also stated that the winds were around 0600 and logged this fact.

The lead controller stated that he had the Marine in sight from the time it began the power run until it apparently disappeared in the clouds just after starting a right climbing turn. The aircraft was enroute at the altitude of 10,000 feet, 22, 23, 24. He saw the leading gun return last but had no recognition of the position. The lead controller believed it to be normal. He was not sure where the

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right climbing turn began rising fast at night low visibility while the aircraft was near the airport boundaries, but also that the turn had been made some distance beyond the northern end of the runway.

When the case left the ground (Metco report), all the controls output but the nose sheet showed 0.004.

The nose sheet was of the type which permits the aircraft to fly straight and level, thanks to its unique arrangement of an otherwise solid plate. The aircraft was flying in standard form. The aircraft was seen in the sky at the moment of collision, and the pilot was flying in the normal roll attitude of the aircraft. None of the controls were visible when they observed the above events.

The slanted view from inside of the Metco 2.62, possible flight paths of both aircraft, and the techniques and flying habits of both crews were thoroughly investigated.

Capt. Wirkkunen had been employed as a pilot for Curtiss since 1935 with the exception of a three-year period during which Capt. W. H. Smith was his chief instructor. He had been flying as a commercial pilot since 1932 and had been flying since about 1935. Capt. Wirkkunen had been flying this DC-3 since purchased by the company in 1939 and had acquired it in the summer of 1940 and had acquired it in the summer of 1940. His total time was 21,000 hours.

TWA flight operations procedures specify that aircraft are to climb straight ahead until reaching an altitude of 500 feet. The crew may then retract power reduced to idle and then climb back to the desired level as recommended.

Following the collision, the air traffic controller gave left lights to let him know what the altitude and position of the aircraft, so the crew might be it should consider returning during instrument flight rules.

The test aircraft was a Metco 2.62, and the flight rate conducted made up predominantly the same wind conditions, at 60° leading and from the rear quarter as used by Capt. Wirkkunen. The test pilot had used Capt. Wirkkunen's technique of 10° lead, and TWA believed that this pilot could duplicate the test cockpit which Capt. Wirkkunen probably used.

The results of the two runs showed that by increasing the vertical position settings, speed and flight rate, the aircraft would fly over the interengaged wings, at an altitude of 1,330 feet above the ground on a heading of 340 to 145 degrees and in an elapsed time of 24 minutes 1.6 seconds. This was the result Capt. Wirkkunen was commanding. The test pilot who had never known to deviate from company policy, the collision probably occurred at an altitude of about 1,700 feet.

During the investigation, an untrained engineer, Captain Clegg, had, however, determined a deviation of 10 degrees from the other evidence, and estimated a separate report of his findings to the Board.

He concluded that the point of collision was very near the location of the recovered DC-3 wing tip since that unit fell nearly straight downward after the collision. The

angle of the descent angle between the two aircraft at the time of the collision substantially agreed with the value assessed by the Board's investigator as reported earlier.

A portion of this engineer's study was devoted to the landing behavior of the DC-3 following the collision. From this trajectory analysis, he concluded that the DC-3 struck the ground 14 seconds after the collision, and that it covered a distance of 3,000 feet over the ground and descended below the horizon to the 10° level. The study further showed, he testified, that based on conservative assumptions the maximum collision altitude was 1,650 feet and that if the collision time, the most common of both aircraft, was eleven seconds, the TWA's pilot would have descended to 1,000 feet above the ground at the time of collision. The rate of the accident was more probably known the collision altitude might be in less than 500 feet.

This engineer further stated that his study indicated the DC-3 had been at 170-180 degrees and the TWA 200-220° landing heading at the time of collision. The Metco 2.62, heading at the time of collision indicated, he believed, that the TWA's pilot started his right turn at the end of run 22, and that the collision occurred 50 seconds later.

The air studies, both aircraft, and the four pilots were completely confirmed.

ANALYSTS

The TWA flight was properly selected for takeoff and the approach instrument flight plan was in order.

Since there were no radio contacts from the DC-3 it is unknown at what altitude the flight was made. It would have been possible to make a radio contact and then with VFR rules follow Burke Creek and Concourse by flying through areas of low ceiling and visibility of less than 500 feet altitude (below minimum) provided the aircraft was operating below clouds and visibility was in less than 3 miles.

Another set of weather data indicated that the lower elevation was solid over the entire route, with the base 3,100 feet at Burke Creek and ranging from 700 to 1,000 feet above the snow line towards southwesterly toward to Laramie. The upper portions of this layer, however, consist of stratocumulus clouds with bases between 3,800 and 4,000 feet at Concourse.

Flight icing was occurring in precipitation and rain along the route of the DC-3 and the TWA aircraft. It was felt, however, that stability could have been reduced as either aircraft by windshield wiper system preventive measures were used. Windshield deicing equipment was available on both aircraft.

It appears that at the collision time, wind velocity to the ground was possible up to 500 feet above the surface. Although the air was wet, reflecting from the surface to the base of the aircraft, it appears highly probable that visibility probably was good, possibly greater than 500 feet, and visibility near the cloud base was considerably less than the surface visibility of less miles. There was very little forward visibility between 700 and 900 feet, and in



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AVIATION WEEK

THE MAGAZINE OF AVIATION BUSINESS

ROBERT W. MARTIN, JR., PUBLISHER

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August 1, 1955

MEMORANDUM TO THE AVIATION INDUSTRY

The tremendous growth of aviation has created a whole new field of needed information services. Today, because of the great expansion of our industry, a publishing task of major importance is the establishment of our industry's first comprehensive annual buyers' guide with a circulation large enough to penetrate the industry's major purchasing influences, domestically and internationally.

November, 1955 will mark the publication of the AVIATION WEEK Buyers' Guide—an annual edition that will answer the long-felt demand of our industry's buyers, in civilian, Air Force and governmental capacities.

Questionnaires are now being mailed to every manufacturer of record engaged in the production and supply of aeronautical products and materials. A year-round research group under editorial supervision has been established to seek out new products, new terminologies—to check and double check the accuracy of all information to be published—the availability and actual production of all items featured.

AVIATION WEEK's annual Buyers' Guide will establish a publishing service unique to our industry. It will be complete and comprehensive—with complete listing of all manufacturers of aeronautical and allied products—not just a token listing, correct and complete addresses; sufficient cross indexing to locate any product regardless of terminology . . . and most important, the Buyers' Guide format will provide, in one complete listing, a simple, easily used method of locating any product. In addition to these important details, the Buyers' Guide will have trade name and distributor listings. These are the factors of completeness—these are the essential features that will make AVIATION WEEK's Buyers' Guide a must for every aviation purchasing influence.

I am sure you will find this annual guide the No. 1 sales and merchandising opportunity for the year-round promotion and advertising of your products, materials and services.

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Robert W. Martin, Jr.
Publisher

* SAFETY

statement conditions prevailed from 900 to about 4,100 feet.

Capt. Wohlkoter was seated on weather conditions before departure and had learned enough from that weather would become dangerous at 4,000 feet that he had the flight re-confirmed without flight plan. On weather conditions which became poorer, and without consulting with any station, on route, it is considered that he failed to exercise reasonable judgment and committed a serious violation of good operating practices. Good judgment would have dictated in light of the weather situation, that the flight should have been planned and conducted so as to avoid flying at low altitude in marginal VFR conditions. The DC-3 was operating in the vicinity of 1,000 feet without being cleared to do so. In air traffic control knew the ceiling was less than 1,000 feet, this clearance was not received.

The DC-3 was equipped with useful transponder and receiver. It is therefore considered that the final cause factor could have occurred.

Comprehensive study and analysis of the evidence was devoted to the question of the point in space where the collision took place. It would have occurred surely over the area where portions of both aircraft were found intermixed. As to whether the location of ground impact was the probable primary debris results of the last flight, other studies were carefully examined and analyzed.

It is reasonable to assume that the DC-3 was at level flight as a result of hearing Wohlkoter say over Cessna 100, "I'm not cold" can be logically verified. However, the DC-3 was in the vicinity of west Cessna 100 when the collision occurred. Cessna 100 was probably the Curtiss DC-3. There was no other DC-3 known to be in the area and the aircraft in question was located in the general direction of the impact only a few minutes before the accident.

Since the DC-3 was not an IFR flight plan the pilot could be expected to have tried to maintain visual contact with the ground. Analysis of some witness testimony, however, indicates that it was being operated on the clouds. The two aircraft were believed to be lost sight of by the TWA aircraft because of the density into the overcast.

Further it will be recalled that one witness stated that an appreciable period of time elapsed between leaving the collision and the time of impact since he apparently did not see the aircraft. One of the several witnesses, a mechanic, stated that he saw an explosion in the air which may indicate that the collision occurred at the base of or in the overcast. Other witnesses also found ground impact but not in relation to the overcast.

During the several hours it took for the search of collision to reach the water surface, the inertia of the two aircraft would tend to make them continue along the same general path they had immediately prior to impact. As a result, the two aircraft may have changed direction very little during the interval until the last witness saw the aircraft.

Capt. Wohlkoter was a pilot of many years' experience and should have been well aware of the danger of flying in a control

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singer configuration is 40 in. Standard lighting, call buttons and ventilation controls are mounted on the underside of the bat rack above the passengers' heads.

Two stewardess stations and a bullet make up the rear portion of the passenger lavatories are forward of the passenger lavatories.

Crew and co-pilot positions are conventional, with provision for a third man on a jump seat.

Two cargo compartments are provided, for a total capacity of 160 cu ft. Access to each compartment is through shoulder-high doors on the lower right side of the implants which swing out and down. Forward load, ahead of the wing, carries 110 cu ft; the aft compartment holds 170 cu ft. A tail-type gate is at the middle of each compartment and at the doors. Floor load capacity is maximum static load of 65 lb/ft².

For Comfort

Passenger seats all recline to 30 deg., with the exception of the first row of aft-facing seats, and the last row which are restricted to 15 deg. Four rubber shock absorbers and light-weight floor covering are standard. Each seat has an integral swivel base pivoted on the seat back and folded onto the deck when not in use. Openings of the seat does not change the position of the installed tray.

Entire implant is pressurized to a maximum differential of one psi. Sea level altitude is maintained to about 14,000 ft. at an airplane altitude of 23,800 ft., the Convair Dart's ceiling altitude is 20,000 ft.

Ground heating and ventilation can be obtained with engine off, heating or refrigeration are available with engine running.

Normal conditioning engine exhausts have been directed away from the fuselage. The prop tips clear the fuselage by three feet and other windshields are faired to reduce vibration.

Performance

Maximum payload of the Convair Dart is figured at 16,500 lb. This breaks down to 60 passengers of 160 lb each, plus 90 lb of luggage and 40 lb of emergency passenger plus an allowance of 1,000 lb for weight growth while in service.

All range figures were based on the American Airlines' requirements. Flight into a 30 deg headwind with a fuel reserve for two hours flight at 14,000 ft altitude at an indicated airspeed of 8.3 times the speed for minimum drag.

Structural design of the airplane is based on a speed of 193 mph at the best cruise altitude for the engines. It was to be high enough to allow operation at maximum cruise rpm at all

powers and altitudes so that descent could be made at cruise power. This is understood to be a limiting factor in Vincent operations, where rate of descent below 15,000 ft is restricted by structural limitations.

Routine lengths were specified by AA to be 4,500 ft for sea level takeoff on a 90% overload deck, with full payload for a 200 cu ft trip, and 500 ft for a 200 cu ft load with adequate safety. Inadequate reserves are the topics quoted in the second paragraph above. For landing, the requirements were a 4,700-ft sea level rollout at full payload and adequate reserve. Antennas specified an alternate 6,000 ft. runway length for takeoff with full payload, due to a 600 ft run required against the 50,000 ft headwind, plus abrupt turns.

Under these conditions the Convair Dart design shows these calculated performance figures:

- 170 cu ft cargo payload at 13,000 ft at landing weight
- 750 mi. operating range at best altitude with full payload
- 4,700 ft. runway length (CAR) for 200 cu ft trip
- 5,100 ft runway length (CAR) for 600 cu ft trip
- 1,600 cu ft trip potential using reserves of 200 cu ft cruise plus 1 hr. flight at 5,000 ft

With over 300 gallons of fuel, range at best altitude is increased to 1,850 mi.

Empty weight of the Dart is 15,300 lbs. Basic operating weight is 46,400 lbs. With the 14,000 lb payload and 15,000 lbs of fuel, the aircraft's weight becomes 67,700 lbs.

TWA Building World's First Lean-To Hangar

World's first lean-to hangar in being built by Trans World Airlines at Philadelphia International Airport. TWA crews the \$1,275,000 facility in double shift round-the-clock operations at Philadelphia until it is completed in the summer of 1960.

The 124 by 275-ft steel and concrete structure will be able to house two Lockheed 101HG Super Constellations at one time. In 51,000 sq ft ground floor will include longer and overhead facilities for maintenance and flight crews on the main floor and second floor. Long bays on the east and west ends will provide storage rooms, aircraft fuel tanks, a fire service room and the entrance lobby.

Roof will be supported entirely by overhead bridge-type cables 30 ft apart. The floor was designed to support 200,000 lb of aircraft with 90,000 lb per square sheet loads.

Provision has been made for future extension that would double width.

Popular DC-6A Setting Standards For Air-Freighter Performance

By Gordon Conley

New York—Douglas Aircraft Co.'s DC-6A Lufthansa is placing a sales contract for development similar to that of the DC-5 in airline passenger growth. The DC-6A is expected to come close to equalling its 20-year-old sister's long operating life despite the large runway lengthen now flying or on disengagements.

Like the DC-5, the Lufthansa is reaching a point where new transports should and should not have it. It would be able to justify the DC-6's sensible economic merits because of its stepped down to less expensive models on its economical theoretical cargo routes.

User Testimonials

Most air cargo experts, with four years to study the DC-6A user statistics, began agreeing the first in 1951, back up the estimation of the Luftwaffe in Germany to Avianca Work.

This summation of the air freighter include:

- **Avianca.** Avianca's division of cargo services, J. M. Gholz: "An hour in the sky is the best the DC-6 is the best and able transported for long haul stage."
- **American.** American's cargo director, Fred C. Johnson: "The DC-6A is the plane that can be operated economically."
- **Shick Airway.** executive vice president, Gordon Biss: "The DC-6A is one of the finest freight transport planes ever developed. The (Lockheed) C-130s and other transports we have are inferior, and only the numbers tell performance figures. So the C-130 is hard to evaluate."

"We believe the commercial return of the C-130 is considerably less than that of the DC-6A," he said. "Even the DC-6A and the Lockheed 134-6A will be good for cargo operations over a year longer."

• **American Airlines' president, John E. McMillan:** "The DC-6A is the best plane on the market today. It's the newest in an old craft transport. If you can get the courage to support a DC-6A, you can make a lot of money with it."

I believe you'll see DC-6A take around for a long time to come."

• **United Air Lines' vice-president of cargo development, E. L. Dase:** "From our point of view, the DC-6A features are its speed and long range, per tonnage, preventing overnight delivery of East to West Coast shipments and short delivery of national east-to-west cargo."

DC-6A ORDERS

	Total	Per	Delivery	Re-order
Europe	3	2	2	2
Germany	2	1	1	1
Czecho-Slovakia	1	1	1	1
United States	7	7	6	6
Cape Cod	4	4	4	4
Puerto Rico	1	1	1	1
Tampa	1	1	1	1
Chicago	1	1	1	1
Shick	2	2	2	2
Trans Caribbean	2	2	2	2

* Four production line positions to Japan Air Lines and changed to K-600.

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CESSNA AIRCRAFT COMPANY, WICHITA, KANSAS

Communications



Supply Drops



last freight plane, such as the C-130A, would need about 10 trucks to fill it up. Keeping that number of trucks lined up and waiting its turn at the door represents a considerable investment in time."

Improved Freighter

American's cargo dash project is indicative of airline efforts to better their present operation of the DC-6A. Other improvements include:

- Increased payload. When the first DC-6A came off the production line, American's maximum payload was 29,900 lb. Total is 32,500 lb.
- Dual landing gear. United's version of the DC-6A will have separate landing for the pilot's compartment and the cabin, providing controlled nose positions for various types of cargo.
- Unit landing. DC-6A landing gear are now single 1 m x 30 mm air囊式 shock absorbers instead of the original 3 m x 10 mm shock absorbers.

Airline officials are working the

and USAF's Military Air Transport Service are trying to reduce their ground costs through experiments with unit landing—consolidation of small planes into a large package.

"When we evaluate shipping on the idea of putting them together in consolidated units, we'll be able to speed up the entire ground handling cycle and reduce cargo damage," says Gild.

"We believe unit landing is one of the reasons in cutting ground time."

"It has got to be reduced before we move from the DC-6A to the larger turboprop freighters. We can't have a \$4 million transport sitting on the ground for an hour while we load it."

Future Outlook

All major air freight nations are working closely the development of Lockheed's C-130A and the Douglas C-112. Airline observers report that the DC-6A will be with us for the sensible foreseeable future," he predicts. "The new aircraft will just start the DC-6A over in medium-and short-haul routes."

possibility of letting Lockheed sweep commercial loads for its new turbofan transports.

Sheld's Gordon Bain says of his possibility: "When and if the C-130 is available, Sheld certainly is interested in acquiring it if the transport performs as reported. For example, it's supposed to weigh 4 cents per ton mile at lower operating costs, compared with 65 cents for the DC-6A. If this is true, it will be a better long-haul transport than our current cargo aircraft—100 mpg, faster and with a \$10,000 per ton payload."

American's Gild says that the C-130A and C-112 will allow airlines to make sharp reductions in traffic and offset nonstop flights that can't get into the air now under present high rates.

"But the DC-6A will be with us for the sensible foreseeable future," he predicts. "The new aircraft will just start the DC-6A over in medium-and short-haul routes."

CAB Settles States-Alaska Fare Rules

By Craig Lewis

Washington, D.C.—Cabin fares between the DC-4 and DC-6B flights between the continental U.S. and Alaska have been established by the Civil Aeronautics Board in its settlement of the fare war dispute over States-Alaska fares.

To back up its decision, CAB has set a schedule of fare minimums for services between the U.S. and various Alaskan points on routes of Pan American World Airways, Alaska Airlines, Northwest Airlines and Pacific Northwest Airlines.

Major findings of the CAB in the States-Alaska Fare Case are:

- Fare reductions proposed by the carriers are reasonable and reasonable fares are required in order to stabilize the States-Alaska fare structure.
- Fare differentials based on equipment should not be established, and the operation of DC-6B aircraft at the same fares charged for DC-4 service is not unfair competitive practice.

• Round-trip fare minimums are set at 100% of minimum one-way fares.

• Pacific Northwest could enter into a price-fixing agreement with Pan American for trans-Pacific service, but Pacific Northwest's basic fares remain.

The Board also decided that individualized fares for passenger service in freight equipment for unchartered and should be allowed to expand. Doing so deflated Northwest's complaint against us by Pacific Northwest of Consolidated equipment in tourist service.

The minimum fares set by the Board

DC-6B combination service, as provided by Northwest and Pan American, is at the mercy of a limited service which makes efficient use of the resources of part of the plane as no aircraft which is no more expensive to operate than the DC-4, and in the light of our finding to consider in the public interest the encouragement and development of air transportation adapted to the needs of the commerce, the Postal Service and the national defense, we find a difference in fares is not warranted.

"We believe that a fair differential would lessen the incentive of the carriers to provide higher equipment and higher fares, the result of which is a sound air transportation system. In this case our primary line of communication is to the Territory of Alaska." In its opinion, the Board said that it doesn't follow that "where newer and better equipment which costs as more to operate is placed in tourist service, we are required to provide higher fares for the same services offered by the newer equipment."

Subsidy Consideration

In setting the fare levels, CAB considered the fact that States-Alaska operations are heavily subsidized—the carriers received \$4,469,823 in subsidies in 1973.

Since nonstop passenger service has been terminated, the air carriers cover most of all the passenger traffic between the U.S. and Alaska, the bulk of which is workers and businessmen not necessarily responsive to fare reductions.

Thus the Board finds no basis for a general fare reduction, nor does it find

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that any increase in force is indicated.

CAB Vice Chairman Joseph F. Admas disagreed with the majority on the issue of fare discounts. He feels that there is a need for reduced fares on shorthaul equipment in long-haul competitive markets. Adams points to the interair Colomar Airlines bid on reducing DC-4 fares between the U.S. and Barbados as an indication of possible benefits for Alaska Airlines should it be allowed to offer lower fares on its DC-4 routes.

Adams' Disson

Adams says that the majority action "dictated the type of sensible, imaginative Board policy which should not cost if we are properly to regulate and develop a dynamic and sound air transportation system."

The majority decision here completely overlooks the fact that it is proposed, inter alia, most routes would be organized by our carriers there have been and will continue to be an enormous large number of serviceable and clearly available noninterdicted networks available for air transportation in the public interest.

"A recognition of this fact should prompt this Board, it seems to me, to establish a means by which these less-least aircraft can be utilized by our carriers under certain profitable and practical conditions," Adams said in his statement.

Navy Leasing R6Ds

To Slick. Flying Tigers

Navy will lease two Starliner aircraft as emergency stand-by aircraft under chapter eight between New York and Franklin, Georgia, pursuant to a contract with the K-1 Travel Club.

Part of the Navy Anthony Line to Atlanta, the two flights between New York and Atlanta never originated.

Slick and Flying Tiger will each get an R6D Starliner, mid-size version of the DC-6A, on a one year lease with a maximum premium. Rental is \$17,000 a month.

Under terms of the lease, the carrier can cancel it at the end of the year by paying an option fee for DC-6A or a plane of equivalent size and capacity.

The lease will run until the aircraft are delivered.

Less than after the Navy is small the airplanes at my time by nothing the aircraft that they are needed.

Navy says the feasibility of the program was proved earlier this year when a Starliner was loaned to Slick for an experimental period. The experiment showed, says the Navy, that Navy cargo aircraft can be maintained and put to productive use without cost to the govern-

ment, and still be available in an emergency.

Through results of negotiations and sufficient availability, Navy says it can meet its passenger mission with slightly fewer planes than it now has, thus reducing utilization. The Navy says it has 55 Starliners, no new aircraft of this type are on order.

Navy is also leasing two R6D (DC-6) aircraft under its old Defense Department contracts. The cargo planes will be loaned to Radle Airlines and Transocean Air Lines for the sum of \$15,000 a month.

The Radle and Transocean leases don't have the purchase option provision contained in the Slick and Flying Tiger contracts.

PAA Increase

Pan American World Airways has increased and expects 25% on its flights between New York and the Caribbean area.

PAA's Latin American Division flew 446,207,000 passenger miles in the first half of 1955, compared with 394,901,000 passenger miles for the same period of 1954.

CAB ORDERS

(July 14 to July 20)

GRANTED:
Standard and Western Airlines an exemption to expand into continental chapter eight between New York and Franklin, Georgia, pursuant to a contract with the K-1 Travel Club.

Part of the Navy Anthony Line to Atlanta, the two flights between New York and Atlanta never originated.

With Slick Airlines an exemption to carry and between New York and Franklin for a period later until the American World Airlines income service at New York division in the management of the Atlanta Air Service, whichever first.

Slick and Flying Tiger will each get an R6D Starliner, mid-size version of the DC-6A, on a one year lease with a maximum premium. Rental is \$17,000 a month.

Under terms of the lease, the carrier can cancel it at the end of the year by paying an option fee for DC-6A or a plane of equivalent size and capacity.

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ENGINEERS



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United Air Lines and various other carriers are to be courted simultaneously. The World War II agreement with the government of India, which provided for technical assistance to India's status quo, has been agreed to withhold the information contained in the agreement from public disclosure.

ORDI REUD

Afrika Afrikans Transport will not be at the mix proposed by the Board in its case since under the present strong law it will not be.

Canadian Air Services' authority to conduct an extensive negotiations survey of Dakar Island, Africa, has extended to July 25, 1955.

Bernard Lehmann, Allgemeine Luftfahrt's former chief press spokesman, has informed publications that the names Carl Linn and Lehmann Linn is the report of the name. The cover stories indicate to me the name Lehmann, German Air force.

West African attempts to provide free transportation in two Pratt & Whitney power plant engines extended to 60 days.

Makro Flug Plant Services application for authority to operate a remanufactured and reconditioned aircraft repair plant in the same Nadi site was denied. The air corporation is ordered out for publishing evidence Sept. 3, 1955.

Amendment of the East African Service Case to include a new route between Nairobi, Kenya, and Mombasa, Kenya, Africa by Sud-Ouest aircraft and a Lake Control proposal for Lake Tanganyika are also denied.

DISBURSED

Tony Ward Atkins' application to relocate Sud-Ouest, Kenia, as an intermediate point between Nairobi, East and Port of the capital of the applicant.

Frigg Eng. Ltd. application for an engine import in one thousand two digits between New York and Paris, at the request of the applicant.

Tony Ward Atkins' application to relocate Sud-Ouest, Kenia, as an intermediate point between Nairobi, East and Mombasa at the request of the applicant.

Application of Harry K. Jensen for a certificate between New York and South Africa. Makro advised the applicant failed to support his CAA request.

Application of Sam H. Conner for a one-way between Seattle and Nome, Alaska since the applicant failed to respond to a CAA request.

Planes of the Air Line Airways & Transport Co., Inc., application for a show cause why its certificate of Airline Services should not be suspended or revoked at the request of the petitioners.

DENIED

Southern Air Transport's application for exemption authority to equal cargo flights as departing, at first day a week between Miami and Barranquilla, Colombia.

Denial of the application of the members of a Bureau of the Davis Certificate of Approval Case adding Gruenewald, U.S., as an intermediate post on September 3.

The American World Airliner's petition for reconsideration in the London Parliament House service case.

EMPLOYMENT OPPORTUNITIES



OPPORTUNITIES

Flight Attendant
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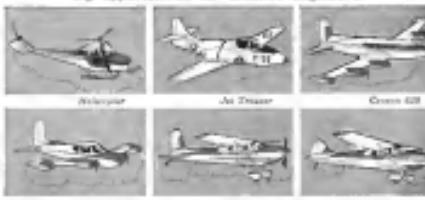
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An outstanding position is immediately available to the qualified engineer capable of heading up the flutter & aerelasticity section of our expanding Model Division. Requires creative individual with extensive background for challenging problems in subsonic and supersonic flutter. You are invited to submit names of background and experience to our

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EDITORIAL

Airborne Radar Boosts Transport Safety

Institution of airborne radar in transports of the major airline and executive aircraft owners marks another major milestone toward improved air transport safety.

The American-Grace Airways is the first to use airborne radar in its transport operations on a regular basis. Pan Am has put its first DC-7 equipped with Bendix X-band radar into service last week on its South America route. American World Washington Editor C. J. McAllister flew on that inaugural operation and will report in detail on the use of radar in next week's issue.

Last week, American World's Equipment Editor George Christian reported on the vital importance of executive plane pilots who are beginning to use airborne radar in their operations (page 54).

Three major avionics firms, Radio Corporation of America, Bendix Aviation Corp. and Collins Radio are now manufacturing a variety of airborne radars especially designed for commercial transport operations. Thanks to the efforts of Aeromatic Radio Inc.'s Air Bus Electronic Engineering Committee working with these avionics manufacturers, a standardized system of warning, mode selection and antenna design has been developed so that airplane manufacturers can build them into transports to take either X-band or C-band radar.

In addition to the Pan Am DC-7 fleet mentioned

American Airlines, United Air Lines, Pan American World Airways, Continental Air Lines and National Airlines have already purchased airborne radar for fleet installations. Eastern Air Lines, Trans World Airlines and Braniff are expected to place their orders soon.

Airborne radar will not help much in alleviating the growing collision problem in the air, but it is a major aid in avoiding the most fatal centers of smash-and-go long range or off-airport navigation. More than half of the airline accidents in which passengers were killed in recent years were involved in turbulence problems. The safety contribution of airborne radar in this field is obvious. It also will permit the airlines to offer their passengers a smoother ride by being able to detect and fly through the ruddier turbulence of the "soft spots" that are always present, even in large storm areas.

In evaluating the contributions of industry to the overall development of this new safety device we can not overlook the pioneering of American Airlines in evaluating the original Navy AN/APG-82 military or bore sight radar for transport use, and the work of United Airlines in evaluating C-band radar for similar use.

The wide spread use of airborne radar marks a progressive step for air transport which will be heartily approved by its customers—the travelling public.

More Technical Coverage

Douglas A. Anderson has been appointed assistant managing editor (technical) to direct the expanding technical coverage to be offered *Aerospace Week* readers. This expansion of technical coverage will include not only more intensive reporting on the fields already covered such as aeronautical engineering, production, avionics and new equipment, but also will continue development into new fields such as guided missile engineering (a feature that began in the July 15 issue), nuclear weapons, aircraft powerplant development, aeronautics and the new sensorimetry required by hypersonic flight. Anderson is particularly well qualified for his new post. He is aeronautical engineering graduate of Rensselaer Polytechnic Institute and had 10 years experience in the aircraft industry as aircraft and powerplant designer and guided missiles before joining *Aerospace Week* in 1958 as engineering editor. During his five years on the magazine he has become particularly well known for his



Editorial Covers

On January 2, 1958 *Aerospace Week* will begin the use of multi-color editorial front covers replacing the advertisements that are now carried in that position. These editorial covers will feature news overall and narrative design research developments and distinguished aviation personalities.

The shift to editorial covers is in line with the editorial publishing policy outlined in the January 28 issue on this page by *Aerospace Week* Publisher Robert W. Martin Jr. It was made possible by the successful completion of the four previous *Aerospace Week* front cover advertising-Cover Division of General Dynamics Corp.-Gramercy Avionics Engineering Corp., Goodyear Aviation Products Division, and the Philadelphia-based Associated Division.

The new editorial covers will bring major benefits to our subscribers and advertisers in helping to build a more useful magazine for the expanding aviation industry.

—Robert Hora

2 In older radars, low-flying planes were set to "ground clutter," appearing like thin ice streaks.

3 Using color has power to eliminate all but moving objects. Low-flying planes appear as simple ice-like streaks.



NEW POWER SOURCE TIGHTENS RADAR DEFENSES

Million-Watt Klystrons Aid Detection of Distant, Low-Flying Planes

THE STORY BEHIND THE STORY

What is the significance of the headlines: "It's here from an old battlefield expression. You can't hit 'em if you can't see 'em"—approaching planes that formerly evaded radar detection can now be seen at greater distances than ever before?

Behind this impressive radar vision is a new type of high power tubes known as Megawatt Klystrons. These new tubes not only provide greater ability for boming radar impulses against small and distant objects, but provide a new

improvement in a technique known as M.T.I. or Moving Target Indication. In radars without M.T.I. everything within the beam of the radar appears on the viewing scope. Images from trees, terrain, buildings, all contribute to form "ground clutter" on the scope. M.T.I. eliminates this "ground clutter" by isolating moving objects only. Therefore with Megawatt Klystrons, approaching aircraft can be spotted sooner and defenses can be alerted more quickly.

Producing millions of watts of microwave power these giant tubes make possible discrimination of small objects

with radar impulses at greater distances to provide clear, sharp images on the radar scope. Furthermore, the Megawatt Klystron's stable performance and long life assure that these radar sources are constantly on guard.

The Klystron tube made microwave radar possible. Developed by Sperry Gyroscope, amplifiers or oscillators manipulate waves. Today Sperry produces klystrons covering a wide range of powers and frequencies for specific requirements—both military and industrial. To meet demands for these tubes, a new plant has just been opened devoted exclusively to Klystron research and production.

SPERRY GYROSCOPE COMPANY
Great Neck, New York
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Strong . . . highly resistant to corrosion . . . nonmagnetic . . . extremely conductive

Now you can use Rollpin to cut assembly and maintenance costs in a whole new group of applications. A new line made of beryllium copper, one of the strongest of the copper base alloys, opens the door to a wide variety of uses where resistance to corrosive attack, good electrical properties and other unusual characteristics are required. These slotted tubular copper spring-pins can be used in assemblies that range from plumbing fixtures to electrical instruments, particularly in conjunction with other copper base alloy components.

Rollpin has already established its ability to replace taper pins, straight pins and set screws; to serve as a rivet, dowel, hinge pin, cotter pin or stop pin . . . eliminating special machining, tapping and the need for hole reaming or precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can be readily drifted out and reused whenever necessary.

Rollpin is available in beryllium copper from .062"-diameter to .250"-diameter, and in steel and stainless steel up to .500"-diameter.

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